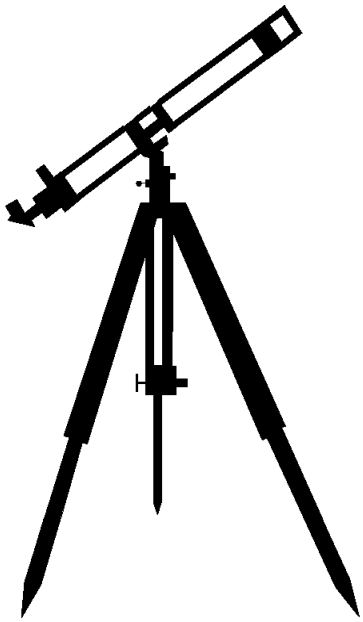
Universe Cycle

The Search for Our Beginnings

SIXTH GRADE

WORKBOOK



student _____

CARTOON OF “THE BIG BANG”

UNIVERSE CYCLE - UNIVERSE (6)
LAB

PROBLEM: Do the constellations of the zodiac and the 12 months of the year correspond to each other in the nighttime sky?

PREDICTION: _____

PROCEDURE:

Part I: Using the Celestial Globe, find out what zodiac constellations appear during each month of the year. Make sure you look at the correct hemisphere.

	CELESTIAL GLOBE	ZODIAC SIGN
JANUARY		
FEBRUARY		
MARCH		
APRIL		
MAY		
JUNE		
JULY		
AUGUST		
SEPTEMBER		
OCTOBER		
NOVEMBER		
DECEMBER		

Part II: Cut out the sky cap and assemble it. Answer the following questions.

1. What zodiac constellations are visible in November?

_____

2. What constellations could you see?

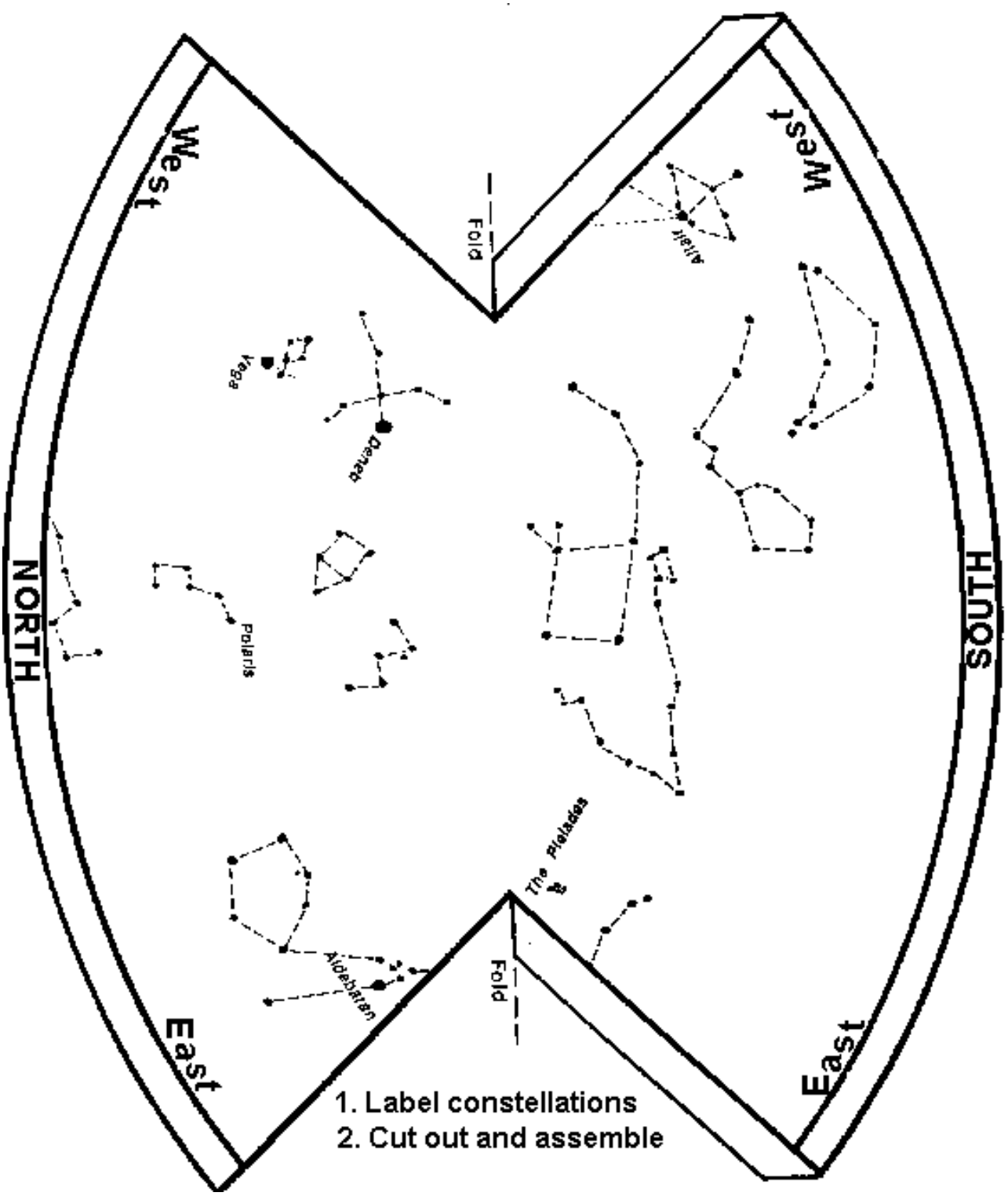
_____

CONCLUSION: What is a constellation? How do the signs of the zodiac correspond to the constellations?

_____

_____

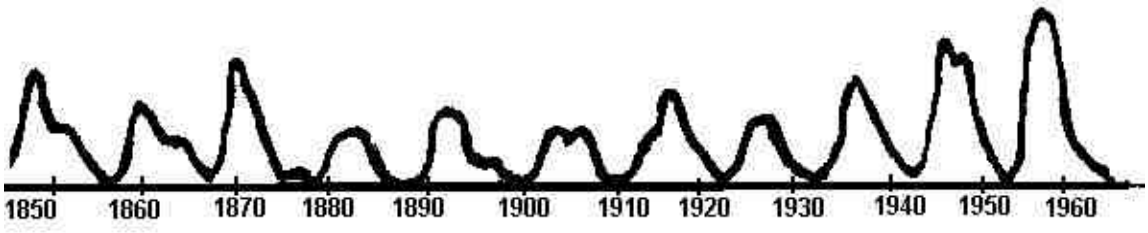
NOVEMBER SKY CAP



UNIVERSE CYCLE - SOLAR SYSTEM (6)
PRE LAB

DATA ON SUNSPOT ACTIVITY

1. Can you determine a cycle from this graph? How can you determine the number of years between each minimum or maximum of activity? Show your work in the space below.



_____
_____
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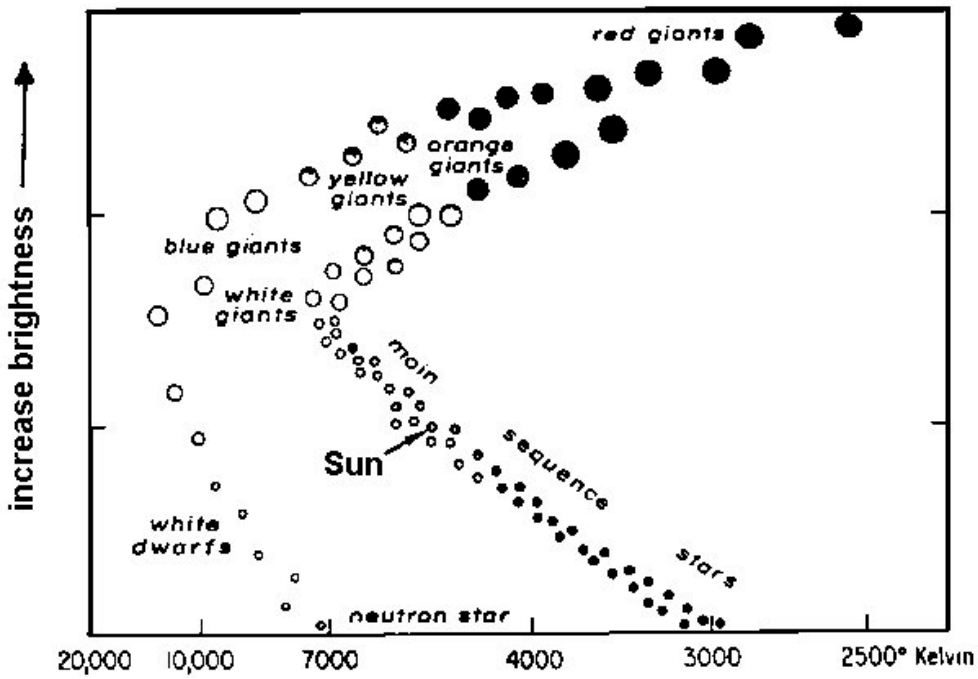


SIMPLIFIED HERTZSPRUNG-RUSSELL DIAGRAM

2. How hot are the following types of stars?
A. Blue giants _____ B. Orange giants _____
C. Red giants _____ D. White dwarfs _____

UNIVERSE CYCLE - SOLAR SYSTEM (6)
LAB

PROBLEM: How does the weight of an object change on different planets?
PREDICTION:

_____

MATERIALS: spring balance (500 gm); items to measure, calculator
PROCEDURE: In your own words, explain the difference between mass and weight.

_____

EXERCISE 1. Measure the following items(remember 1 pound = 16 ounces):

ITEM	GRAMS	CONVERT TO OZ. (1 lb = 16 ounces) (1 gm = .0353 ounces)

EXERCISE 2. Determine your own weight, and two other items that your teacher has provided. Calculate the weights of yourself and the two items on the planets. To find your weight in grams, use the calculation below.

weight in pounds = _____ X .4536 = _____ grams

planets	**calculation**	**my weight on other planets in grams**	**item 1**	**item 2**
MERCURY	**0.36**			
VENUS	**0.89**			
EARTH	**1.00**			
MARS	**0.39**			
JUPITER	**2.54**			
SATURN	**1.06**			
URANUS	**1.08**			
NEPTUNE	**1.38**			
PLUTO	**0.018**			

CONCLUSIONS: Why do things have different weights on different planets? Where would you be the heaviest and lightest? Why does Pluto have a question mark?

_____

_____

UNIVERSE CYCLE - SOLAR SYSTEM (6)
POST LAB

PUT THE PLANETS IN A LINE

Chorus:
Put the planets in a line.
Count them, count them one through nine.
In order, racing round the sun,

Mercury is number one! Mercury:
Closest to the sun, 'm told,
It's boiling hot, then freezing cold!
No atmosphere or life, it's just
A small gray ball of rock and dust.
Ancient craters dot its face,
The fastest planet in the race!
Repeat chorus.

Venus is the second one! Venus:
It's like the Earth in shape and size,
But on Venus nothing can survive.
Steep mountaintops and dusty plains
'Neath sulfur clouds of poison rain!
These yellow clouds reflect sunlight -It's
the brightest planet in our night!

The planet Earth, we'll sing about,
A sweet home, yours and mine.
In order, racing round the sun,
It is the third in line. Earth!
Repeat chorus

Mars is fourth, the reddest one! Mars:
The Earth has one moon, Mars has two.
Life might exist, but not like you or me.
There are storms of swirling dust.
Volcanoes, canyons, ice, and rust.
The sun's so hot 'would burn our hair,
And plus, we couldn't breathe the air!

These first four planets we've described
Are terrestrial, there's land inside.
Beyond them, through the asteroid belt,
Is where the great gas giants dwell!
(Repeat chorus)

Jupiter is fifth, the biggest one! Jupiter:
It's a ball of liquid hydrogen,
If you stood on it, you'd sink in!
It's wrapped in clouds and colored rings
Of gas and rocks and whizzing things,
Its storm, the great Red Spot, goes zooming
Round it, so do sixteen moons!
You's see no life as you fly by
This shining giant in the sky.
(Repeat chorus)

Saturn's sixth, the ice-ringed one! Saturn:
Second largest of the nine,
This whirling ball of gas goes flying.
Through large, it's light enough to float
On water, like a giant boat!
Astronomers will always sing
Of Saturn and its dazzling rings!
(Repeat chorus)

Uranus is the seventh one! Uranus:
So far from Earth it's rarely seen,
Enwrapped in clouds of bluish green.
Tipped sideways, it's the only one
Whose top is pointed towards the sun!
Ancients eyes the other six,
Took a telescope to find Uranus!
(Repeat chorus)

Neptune's next, the eighth one! Neptune:
The last of the gas giants,
It has eight moons which accompany it.
Eight billion miles from Earth, it spins
Amidst blue clouds of hydrogen,
Named for the great god of the sea,
It swims around the galaxy!
(Repeat chorus)

Pluto's ninth, the smallest one! Pluto:
Pluto is so far away,
If you stood on it, you would say,
"From here the Earth looks like a star."
It's unexplored by man, so far
Last in line of those we know,
One moon goes where Pluto goes.

Put the planets in a line.
Count them, count them one through nine.
Just portions of our galaxy,
There's still much more to seek and see -The
universe...infinity!

by Dan Cooper
from *Star Tunes*

UNIVERSE CYCLE - EARTH (6)
PRE LAB

Fill in the answers to the following review questions.

Describe the shape of the Earth. _____

What is the correct tilt of the Earth's axis?
_____

How does the tilt of the axis effect temperatures on the Earth's surface?
_____
_____

What revolves around the Sun?
_____

What revolves around the Earth?
_____

Which bodies rotate? _____

Is the Sun a planet?
_____

Is the Moon a planet?
_____

How long does it take for the Earth to make one full rotation? _____

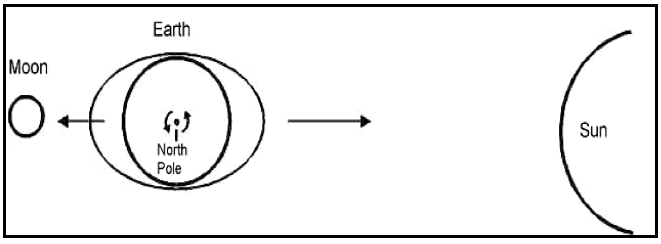
How long does it take for the Earth to revolve one time around the Sun? _____

How long does it take the Moon to rotate once around the Earth? _____

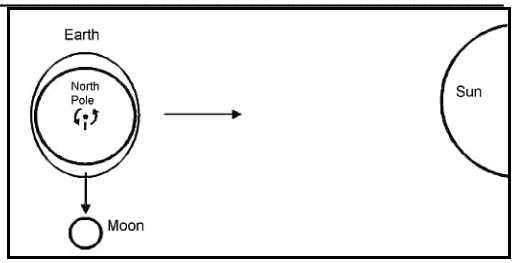
How long does it take for the Moon to revolve around the Earth? _____

Around what does the Sun revolve?_____

Explain the difference between a neap tide and spring tide by using the pictures below. Identify which one is neap and spring.
_____
_____
_____



A



B

UNIVERSE CYCLE - EARTH (6)
LAB

PROBLEM: Are seasons the same around the Earth?

PREDICTION:_____

PROCEDURE: MATERIALS: PLANETARIUM. Move the model to try and figure out the following questions and to fill in the chart below.

1. Which two ways does north point on the Earth in the Northern Hemisphere in June and December? Draw a picture.
2. Does the Earth's axis point the opposite direction or the same direction in the Southern Hemisphere? _____
3. Does the position of the Moon affect the seasons? Why? _____
4. Does the distance of the Earth to the Sun change with the seasons?_____
5. Does the angle at which the Sun strikes the Earth's surface change with the seasons?_____
6. Which affects the seasons the most, distance or angle at which the sun strikes?

_____

Use the planetarium model to figure out how much sunlight there is at these location. To fill in the chart below use the following terms: 24 hrs darkness, 24 hrs of light, more day than night, 12 hrs dark/12 hrs light (12/12), Sun directly overhead, mixed hours of day and night.

	Dec. 21	Mar. 21	June 21	Sept. 23
North Pole				
Arctic				
Tropic of Cancer				
Equator				
Tropic of Capricorn				
Antarctica				
South Pole				

CONCLUSION: Are seasons the same all around the world?_____
Explain._____

UNIVERSE CYCLE - EARTH (6)
POST LAB

Read the excerpt from Hawaii, and answer the questions on the worksheet.

HAWAII

by James A. Michener

Millions upon millions of years ago, when the continents were already formed and the principal features of the Earth had been decided, there existed, then as now, one aspect of the world that dwarfed all others. It was a mighty ocean, resting uneasily to the east of the largest continent, a restless ever-changing, gigantic body of water that would later be described as Pacific.

Over its brooding surface immense winds swept back and forth, whipping the waters into towering waves that crashed down upon the world's seacoasts, tearing away rocks and eroding the land. In its dark bosom, strange life was beginning to form, minute at first, then gradually of a structure now lost even to memory. Upon its farthest reaches birds with enormous winds came to rest, and then flew on.

Agitated by a moon stronger than now, immense tides ripped across this tremendous ocean, keeping it in a state of torment. Since no great amounts of sand had yet been built, the waters where they reached shore were universally dark, black as night and fearful.

Scores of millions of years before man had risen from the shores of the ocean to perceive its grandeur and to venture forth upon its turbulent waves, this eternal sea existed, larger than any other of the Earth's features, vaster than the sister oceans combined, wild, terrifying in its immensity and imperative in its universal role.

How utterly vast it was! How its surges modified the very balance of the Earth! How completely lonely it was, hidden in the darkness of night or burning in the dazzling power of a younger sun than ours.

At recurring intervals the ocean grew cold. Ice piled up along its extremities, and so pulled vast amounts of water from the sea, so that the wandering shoreline of the continents sometimes jutted miles farther out than before. Then for a hundred thousand years, the ceaseless ocean would tear at the exposed shelf of the continents, grinding rocks into sand and incubating new life.

Later, the fantastic accumulations of ice would melt, setting cold waters free to join the heaving ocean and the coasts of the continents would lie submerged. Now the restless energy of the sea deposited upon the ocean bed layers of silt and skeletons and salt. For a million years the ocean would build soil, and then the ice would return; the waters would draw away, and the land would lie exposed. Winds from the north and south would howl across the empty seas and lash stupendous waves upon the shattering shore. Thus the ocean continued its alternate building and tearing down.

Master of life, guardian of the shorelines, regulator of temperatures and heaving sculptor of mountains, the great ocean existed.

UNIVERSE CYCLE - EARTH (6)
POST LAB

1. What ocean is James Michener describing?_____

2. Is this an accurate description of this ocean? Why or why not?

_____
_____

3. In the sixth paragraph, what is Michener describing when he says, "Ice piled up along its extremities, ..."?

_____

4. What is the introduction to *Hawaii* describing?

_____
_____
_____

Define the following words or phrases:

5. "whipping the waters" (2nd paragraph)_____

6. "dark bosom" (2nd paragraph) _____

7. agitated (3rd paragraph)_____

8. tremendous (3rd paragraph)_____

9. universally (3rd paragraph) _____

10. turbulent (4th paragraph)_____

11. eternal (4th paragraph)_____

12. surges (5th paragraph) _____

13. jutted (6th paragraph)_____

14. stupendous (7th paragraph)_____

UNIVERSE CYCLE - GEOGRAPHY (6)
PRE LAB

Directions: Answer the following questions. Describe the type of map you would use for each answer.

1. Susie lives in California and wants to go to New York City. What kind of map would she use to find out what states she will cross?

_____
_____

2. A pilot is going to Russia from San Francisco. How would he find out the shortest route to fly there?

_____
_____

3. A sailor wants to know how many nautical miles there are between Hawaii and San Francisco. What kind of map would he use?

_____
_____

4. A hiker wants to climb Mt. Whitney in California. What map will tell him how many feet she will have to climb to get to the top?

_____
_____

5. A team of geologists wants to know if there are igneous rocks where they are working. What kind of map would they use?

_____
_____

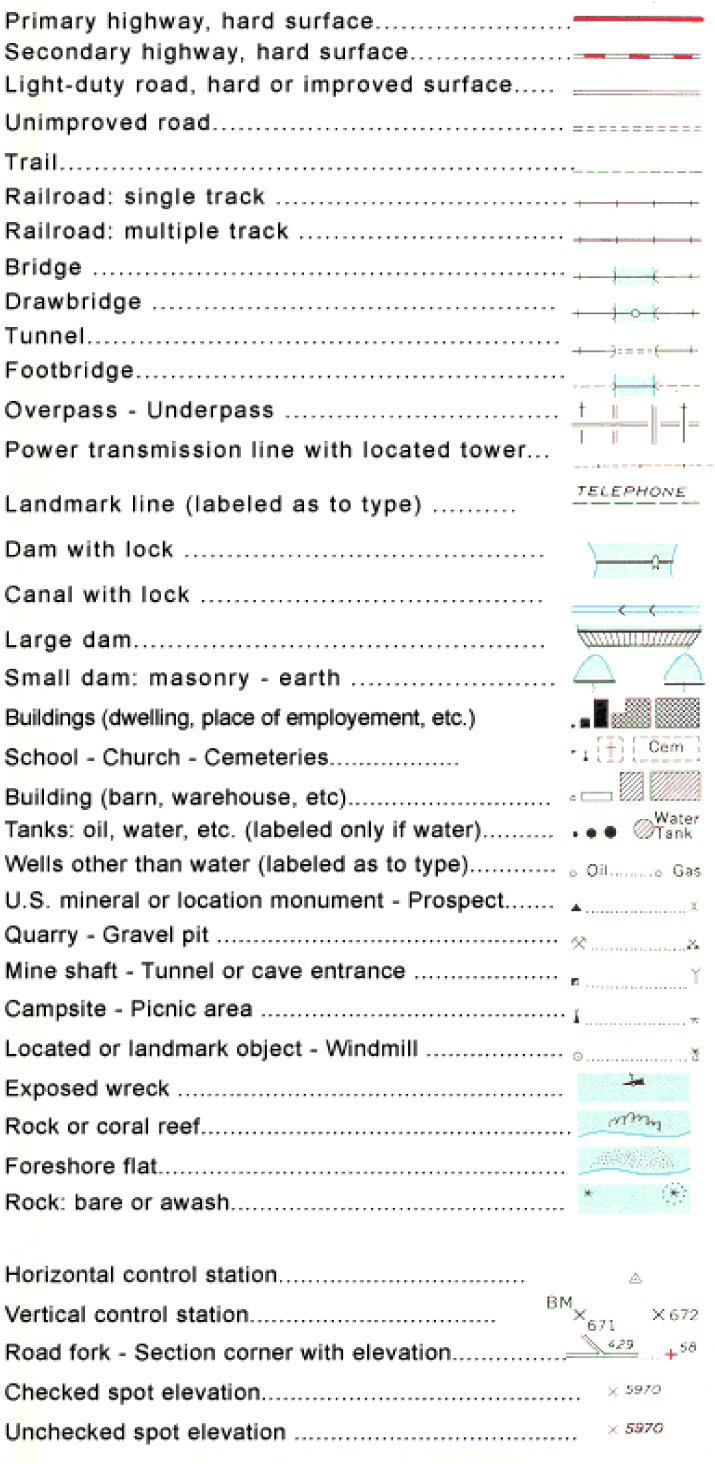
6. Where on a map can you find a list of the symbols used on it?

_____

7. For each map item below, draw the correct symbol. Use the Topographic Map Symbols to find the answer.

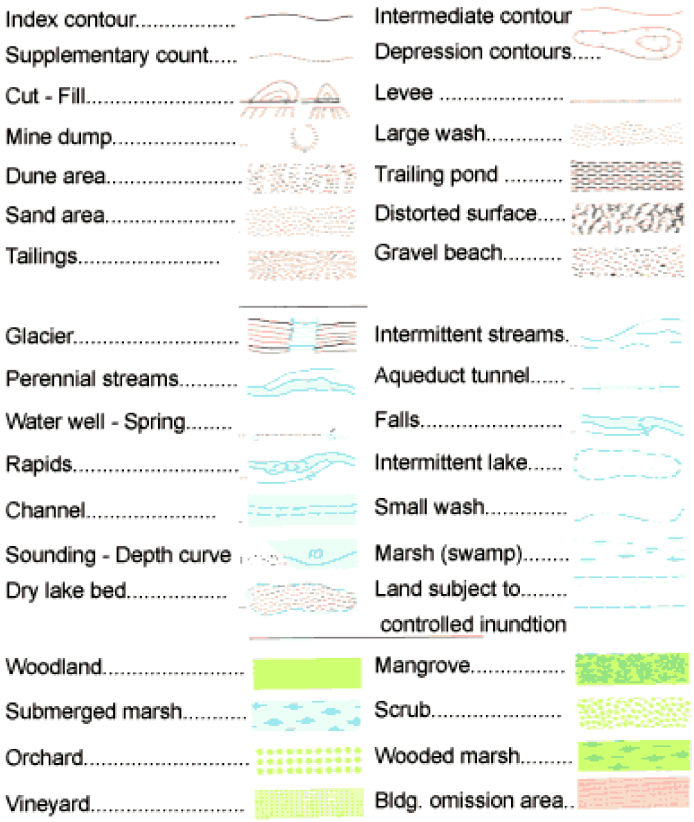
Railroad		Highway		Marsh	
Mine		Church		School	

TOPOGRAPHIC MAP SYMBOLS



VARIATIONS WILL BE FOUND ON OLDER MAPS

Boundary: national .....
State .....
county, parish, municipio.....
civil township, precinct, town, barrio.....
incorporated city, village, town, hamlet.....
reservation, national or state.....
small park, cemetery, airport, etc.....
land grant.....
Township or range line, U.S. land survey....
Section line, U.S. land survey.....
Township line, not U.S. land survey.....
Section line, not U.S. land survey.....
Fence line or field line.....
Section corner: found - indicated.....
Boundary monument: land grant - other.....



UNIVERSE CYCLE - GEOGRAPHY (6)
LAB

PROBLEM: Can maps help you design a "defense" strategy?
PREDICTION:_____
PROCEDURE:

In this exercise, you are the leaders of a group of cave people. You live in a good area, that has lots of water, animals to hunt, and plants to gather. On the topographic map, this area is called “The Basin”. There is even a good outcrop of flint for making spear points and arrowheads. This outcrop is labeled on the map. Unfortunately, another group of people is trying to invade your territory. As the leaders of your group, your job is to design a way to defend your territory against the invaders.

EXERCISE 1. Answer the following questions.

1. What topographic map quadrangle are you using?

_____

2. What is the altitude of the Basin?

_____

3. What is the blue line that goes south from the Basin?_____

4. What route do you think invaders might take in attacking your area? _____

_____

5. How will you defend both your home area and the flint outcrop? _____

_____

EXERCISE 2.

1. Cut out the icons on the following page. These are the people, animals, and resources you have to defend your home. Each weapon or item represents a person. Each animal icon is one animal. Draw new icons if you wish. Remember to keep your icons appropriate to cave people: no missiles or tanks!.

2. Read the topographic map and try to visualize the landscape it shows. Be sure to keep in mind the location of hills, valleys, water, and the resources you are trying to defend.

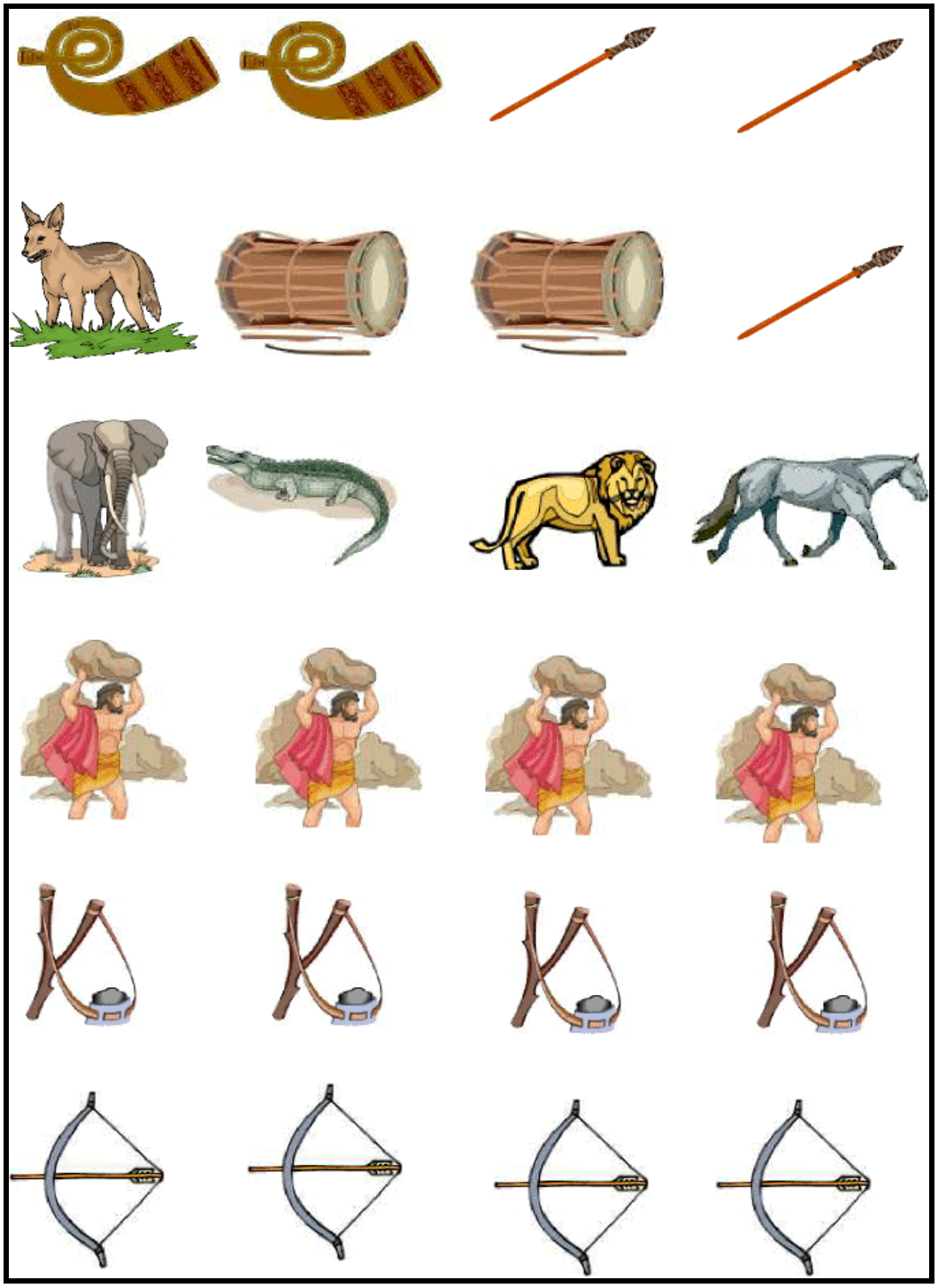
3. Arrange the icons on the map in the way you think best defends your home. Use your knowledge of contours in your defense as much as possible. You may wish to have someone in your group pretend to be an invader, to find weaknesses in your strategy. 4. Write down your plan of attack below. Be sure to explain how you used topography in your defense. Use more space if you need to.

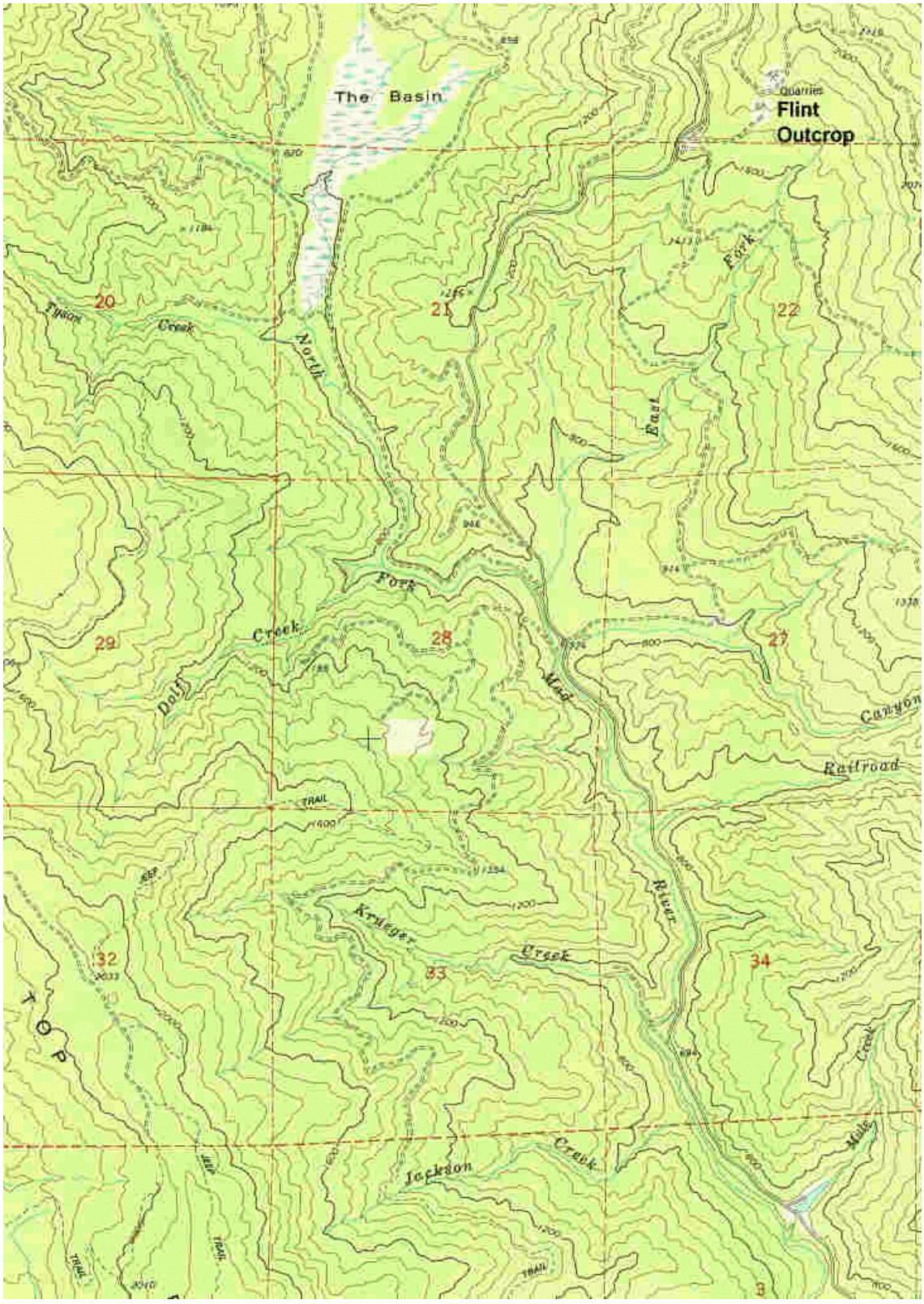
_____
_____
_____
_____
_____

CONCLUSION: Are topographic maps useful in preparing against invasion?

_____
_____

Icons for Defense




The Basin
Quarries
Flint
Outcrop
Tyson
Creek
North
Fork
East
Fork
Dry
Creek
Mud
Canyon
Railroad
TRAIL
Krueger
Creek
River
Jackson
Creek
Mule
Creek
TOP
20
21
22
29
28
27
32
33
34
3

UNIVERSE CYCLE - GEOGRAPHY (6)
POST LAB