

# GeoTroopers

It's time to test your science & navigation skills!

Team Members: \_\_\_\_\_ Team Color: \_\_\_\_\_

Use the Challenge Cards to help you find the information needed to complete this assignment.

**First** – Calculate the waypoint using the information given and then use the GPS unit to find the location.

**Second** – Complete the task listed on the Challenge Card or hidden in the microcache (film canister).

All microcaches must be left EXACTLY as you found them – paper inside and in same spot!

<b>Challenge #</b> _____
A # _____ - _____
B # _____ - _____
C # _____ - _____
D # _____ - _____

<b>Challenge #</b> _____
A # _____ - _____
B # _____ - _____
C # _____ - _____
D # _____ - _____

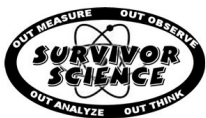
<b>Challenge #</b> _____
A # _____ - _____
B # _____ - _____
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A # _____ - _____
B # _____ - _____
C # _____ - _____
D # _____ - _____

Tie Breaker: Choose a number between 1 and 100 - \_\_\_\_\_



## Challenge #1

### #1A

**Waypoint:**

# of months in a year + 4

**Task:**

Use the Tree ID Guide to identify this tree.

### #1B

**Waypoint:**

Atomic Mass of Nitrogen (rounded)

**Task:**

What type of plant is this? Hint: Its name might make you think of a feline.

### #1C

**Waypoint:**

# of legs on an insect

**Task:**

Find the microcache at this location and use the Insect ID book to help you identify the order to which the insect belongs. Replace it EXACTLY where you found it!

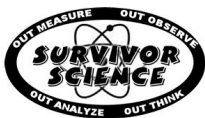
### #1D

**Waypoint:**

# of protons in Potassium

**Task:**

Find the microcache at this location and answer the question inside. Replace it EXACTLY where you found it!



## Challenge #2

### #2A

**Waypoint:**

# of letters in the name of element Si x 3

**Task:**

Use the Tree ID Guide to identify this tree.

### #2B

**Waypoint:**

# of letters in the name of the animal group that contains crabs, lobsters, and shrimp (plural form)

**Task:**

What type of plant is this? Hint: Monarchs need this plant!

### #2C

**Waypoint:**

# of extra day(s) in a leap year

**Task:**

Find the microcache at this location and use the Insect ID book to help you identify the order to which the insect belongs. Replace it EXACTLY where you found it!

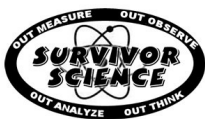
### #2D

**Waypoint:**

# of valence electrons in an atom of Boron

**Task:**

Find the microcache at this location and answer the question inside. Replace it EXACTLY where you found it!



## Challenge #3

**#3A**

**Waypoint:**

# of letters in the animal group that contains spiders + 8 (plural form)

**Task:**

Use the Tree ID Guide to identify this tree.

**#3B**

**Waypoint:**

# of letters in the name of a square yellow cartoon character that lives in Bikini Bottom

**Task:**

What type of plant is this? Hint: It might be used in chewing gum and tea.

**#3C**

**Waypoint:**

The “unlucky” number – Friday the \_\_\_<sup>th</sup>

**Task:**

Find the microcache at this location and use the Insect ID book to help you identify the order to which the insect belongs. Replace it EXACTLY where you found it!

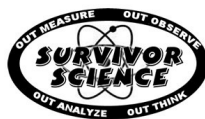
**#3D**

**Waypoint:**

# of electrons in an atom of Titanium

**Task:**

Find the microcache at this location and answer the question inside. Replace it EXACTLY where you found it!



## Challenge #4

**#4A**

**Waypoint:**

# of neutrons in an atom of Be

**Task:**

Use the Tree ID Guide to identify this tree.

**#4B**

**Waypoint:**

# of letters in the name of the group that contains frogs and toads (plural form)

**Task:**

What type of plant is this? Hint: This plant is used for perfumes and is also the name for a light-purple color.

**#4C**

**Waypoint:**

# of electrons in an atom of Calcium

**Task:**

Find the microcache at this location and use the Insect ID book to help you identify the order to which the insect belongs. Replace it EXACTLY where you found it!

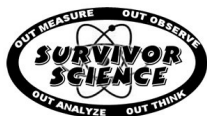
**#4D**

**Waypoint:**

# of letters in the term for animals that eat other animals – 3 (plural form)

**Task:**

Find the microcache at this location and answer the question inside. Replace it EXACTLY where you found it!



## Challenge #5

**#5A**

**Waypoint:**

# of legs on an arachnid

**Task:**

Use the Tree ID Guide to identify this tree.

**#5B**

**Waypoint:**

# of letters in the name of element Sn x 5

**Task:**

What type of plant is this? Hint: It is the same name as Donald Duck's girlfriend.

**#5C**

**Waypoint:**

# of protons in an atom of Manganese - 1

**Task:**

Find the microcache at this location and use the Insect ID book to help you identify the order to which the insect belongs. Replace it EXACTLY where you found it!

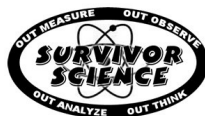
**#5D**

**Waypoint:**

Number of energy levels in Potassium.

**Task:**

Find the microcache at this location and answer the question inside. Replace it EXACTLY where you found it!



## Challenge #6

**#6A**

**Waypoint:**

# of electrons in an atom of Argon

**Task:**

Use the Tree ID Guide to identify this tree.

**#6B**

**Waypoint:**

# of months in a leap year

**Task:**

What type of plant is this? Hint: The name might refer to a girl with dark eyes.

**#6C**

**Waypoint:**

Number of valence electrons in an atom of Mg

**Task:**

Find the microcache at this location and use the Insect ID book to help you identify the order to which the insect belongs. Replace it EXACTLY where you found it!

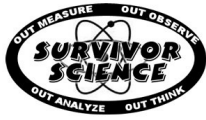
**#6D**

**Waypoint:**

Number of protons in an atom of Na +  
Number of protons in an atom of Mg

**Task:**

Find the microcache at this location and answer the question inside. Replace it EXACTLY where you found it!



## Challenge #7

#7A

**Waypoint:**

If an organism has a total of 40 chromosomes, how many would each sex cell have?

**Task:**

How would you classify this tree?  
Choose one: Deciduous or Conifer

#7B

**Waypoint:**

# of neutrons in an atom of Ti

**Task:**

Unscramble the letters to figure out the name of this plant: H L O L Y H C O K

#7C

**Waypoint:**

# of days in February (not a leap year) - 1

**Task:**

Find the microcache at this location and use the Insect ID book to help you identify the order to which the insect belongs. Replace it EXACTLY where you found it!

#7D

**Waypoint:**

# of electrons in an atom of Fe - 1

**Task:**

Find the microcache at this location and answer the question inside. Replace it EXACTLY where you found it!

Print the questions and pictures below. Place each one in a film canister to create a microcache and hide at the specified waypoints.

#1D – What type of consumer eats insects? An example is a frog.

#2D – What provides all the energy in a food web? Hint: It is a star!

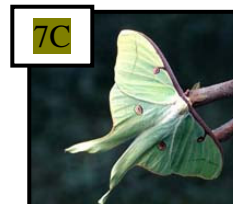
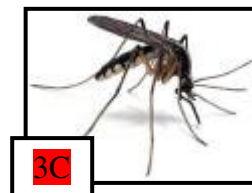
#3D – What type of organism supplies all the food for an ecosystem? Choose one: Producer, Consumer, or Decomposer

#4D – What type of consumer eats plankton (the microscopic organisms that live in water)?

#5D – Give an example of a biotic factor that is found in the schoolyard habitat.

#6D – How would carnivores, omnivores, and herbivores be classified? Choose one: Producer, Consumer, or Decomposer

#7D – How are molds, fungi, and bacteria classified? Choose one: Producer, Consumer, or Decomposer



## Answer Key:

### Challenge 1

- A – Waypoint = 16, Tree = Dogwood
- B – Waypoint = 14, Plant = Cattails
- C – Waypoint = 6, Insect = Lepidoptera
- D – Waypoint = 19, Plant = Insectivore

### Challenge 2

- A – Waypoint = 21, Tree = Blue Spruce
- B – Waypoint = 11, Plant = Milkweed
- C – Waypoint = 1, Insect = Coleoptera
- D – Waypoint = 3, Plant = Sun

### Challenge 3

- A – Waypoint = 17, Tree = Pin Oak
- B – Waypoint = 9, Plant = Mint
- C – Waypoint = 13, Insect = Diptera
- D – Waypoint = 22, Plant = Producer

### Challenge 4

- A – Waypoint = 5, Tree = Sweet Gum
- B – Waypoint = 10, Plant = Lavender
- C – Waypoint = 20, Insect = Orthoptera
- D – Waypoint = 7, Plant = Planktivore

### Challenge 5

- A – Waypoint = 8, Tree = White Oak
- B – Waypoint = 15, Plant = Daisy
- C – Waypoint = 24, Insect = Odonata
- D – Waypoint = 4, Plant = Any living thing

### Challenge 6

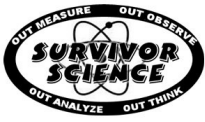
- A – Waypoint = 18, Tree = Elm
- B – Waypoint = 12, Plant = Black-eyed Susan
- C – Waypoint = 2, Insect = Hymenoptera
- D – Waypoint = 23, Plant = Consumer

### Challenge 7

- A – Waypoint = 20, Tree = Conifer
- B – Waypoint = 26, Plant = Holly Hock
- C – Waypoint = 27, Insect = Lepidoptera
- D – Waypoint = 25, Plant = Decomposer

Don't have GPS units? Use colored flags with numbers on them or another type of marker that the kids can look for in the schoolyard. You might also provide a map of the schoolyard with the numbers listed at each location.

Each tribe received a tree identification book, a Golden Guide: Insects book, a copy of a periodic table, and copies of the Ecology and Animal World textbooks. I give tribes 10 to 15 minutes on the day before this challenge to review and record notes that they may use on the challenge. You can also provide the "Things to Know" handout on the next page.



# Things To Know ...

## Ecology Review

**Producers** – Source of all the food in an ecosystem

**Consumer** – Organisms that cannot produce their own food; carnivores, herbivores, omnivores, insectivores, and plantivores

**Decomposers** – Organisms that break down dead plants and animals; molds, fungi, and bacteria

**Food Chain** – Shows the relationships of animals in an ecosystem.

**Food Web** – A collection of all the food chains in an ecosystem

**Biotic** – The living things in an ecosystem; plants and animals

**Abiotic** – The nonliving things in an ecosystem; air, water, soil, rocks, etc.

1 <b>H</b> Hydrogen 1.00794	<p>Atomic Number - # of protons or electrons</p> <p>Symbol &amp; Name</p> <p>Atomic Mass - # of protons + neutrons</p>
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## Types of Trees

**Deciduous** – Trees that lose their leaves each fall

**Coniferous** – Trees that produce cones and needles with some needles staying on the tree all year long

# of Valence Electrons = Family (column)  
# of Energy Levels = Period (row)

alkali metals I A										noble gases 0																
Period 1	1 <b>H</b> 1.01 Hydrogen											2 <b>He</b> 4.00 Helium														
Period 2	3 <b>Li</b> 6.94 Lithium	alkaline earth metals II A										4 <b>Be</b> 9.01 Beryllium														
Period 3	11 <b>Na</b> 22.99 Sodium	transition metals										12 <b>Mg</b> 24.31 Magnesium														
												III A	IV A	V A	VI A	VII A	18 <b>Ar</b> 39.95 Argon									
Period 4	19 <b>K</b> 39.10 Potassium	20 <b>Ca</b> 40.08 Calcium	21 <b>Sc</b> 44.96 Scandium	22 <b>Ti</b> 47.88 Titanium	23 <b>V</b> 50.94 Vanadium	24 <b>Cr</b> 52.00 Chromium	25 <b>Mn</b> 54.95 Manganese	26 <b>Fe</b> 55.85 Iron	27 <b>Co</b> 58.93 Cobalt	28 <b>Ni</b> 58.70 Nickel	29 <b>Cu</b> 63.55 Copper	30 <b>Zn</b> 65.39 Zinc	31 <b>Ga</b> 69.72 Gallium	32 <b>Ge</b> 72.61 Germanium	33 <b>As</b> 74.92 Arsenic	34 <b>Se</b> 78.96 Selenium	35 <b>Br</b> 79.90 Bromine	36 <b>Kr</b> 83.80 Krypton								
Period 5	37 <b>Rb</b> 85.47 Rubidium	38 <b>Sr</b> 87.62 Strontium	39 <b>Y</b> 88.91 Yttrium	40 <b>Zr</b> 91.22 Zirconium	41 <b>Nb</b> 92.91 Niobium	42 <b>Mo</b> 95.94 Molybdenum	43 <b>Tc</b> (98) Technetium	44 <b>Ru</b> 101.07 Ruthenium	45 <b>Rh</b> 102.91 Rhodium	46 <b>Pd</b> 106.4 Palladium	47 <b>Ag</b> 107.87 Silver	48 <b>Cd</b> 112.41 Cadmium	49 <b>In</b> 114.82 Indium	50 <b>Sn</b> 118.71 Tin	51 <b>Sb</b> 121.74 Antimony	52 <b>Te</b> 127.60 Tellurium	53 <b>I</b> 126.90 Iodine	54 <b>Xe</b> 131.29 Xenon								
Period 6	55 <b>Cs</b> 132.91 Cesium	56 <b>Ba</b> 137.33 Barium	Lanthanide series (see below)	72 <b>Hf</b> 178.49 Hafnium	73 <b>Ta</b> 180.94 Tantalum	74 <b>W</b> 183.85 Tungsten	75 <b>Re</b> 186.21 Rhenium	76 <b>Os</b> 190.23 Osmium	77 <b>Ir</b> 192.22 Iridium	78 <b>Pt</b> 195.08 Platinum	79 <b>Au</b> 196.97 Gold	80 <b>Hg</b> 200.59 Mercury	81 <b>Tl</b> 204.38 Thallium	82 <b>Pb</b> 207.2 Lead	83 <b>Bi</b> 208.98 Bismuth	84 <b>Po</b> (209) Polonium	85 <b>At</b> (210) Astatine	86 <b>Rn</b> (222) Radon								
Period 7	87 <b>Fr</b> (223) Francium	88 <b>Ra</b> 226.03 Radium	Actinide series (see below)	104 <b>Rf</b> (261) Rutherfordium	105 <b>Db</b> (262) Dubnium	106 <b>Sg</b> (263) Seaborgium	107 <b>Bh</b> (262) Bohrium	108 <b>Hs</b> (265) Hassium	109 <b>Mt</b> (266) Meitnerium	110 (269) Darmstadtium	111 (272) Roentgenium	112 (277) Copernicium	114 (281) Flerovium	116 (289) Livermorium	118 (293) Oganesson											
rare earth elements—Lanthanide series												57 <b>La</b> Lanthanum	58 <b>Ce</b> Cerium	59 <b>Pr</b> Praseodymium	60 <b>Nd</b> Neodymium	61 <b>Pm</b> (145) Promethium	62 <b>Sm</b> Samarium	63 <b>Eu</b> Europium	64 <b>Gd</b> Gadolinium	65 <b>Tb</b> Terbium	66 <b>Dy</b> Dysprosium	67 <b>Ho</b> Holmium	68 <b>Er</b> Erbium	69 <b>Tm</b> Thulium	70 <b>Yb</b> Ytterbium	71 <b>Lu</b> Lutetium
Actinide series												89 <b>Ac</b> Actinium	90 <b>Th</b> Thorium	91 <b>Pa</b> Protactinium	92 <b>U</b> Uranium	93 <b>Np</b> Neptunium	94 <b>Pu</b> (244) Plutonium	95 <b>Am</b> (243) Americium	96 <b>Cm</b> (247) Curium	97 <b>Bk</b> (247) Berkelium	98 <b>Cf</b> (251) Californium	99 <b>Es</b> (252) Einsteinium	100 <b>Fm</b> (257) Fermium	101 <b>Md</b> (258) Mendelevium	102 <b>No</b> (259) Nobelium	103 <b>Lr</b> (260) Lawrencium