

Name: KEY

Date: \_\_\_\_\_

Life Science

Period: \_\_\_\_\_

Genetics

### punnett square practice

1. Let's say that in seals, the gene for the length of the whiskers has two alleles. The dominant allele (W) codes long whiskers and the recessive allele (w) codes for short whiskers.

a. What is the probability of producing offspring that have short whiskers from a cross of two long-whiskered seals, one that is homozygous dominant and one that is heterozygous? Show your work on the punnett square.

	W	W
W	WW	WW
w	Ww	Ww

100 % long whiskers

0 % short whiskers

b. If one parent seal is a heterozygous long-whisker and the other is short-whiskered, what is the probability that the offspring will have short whiskers?

	W	w
w	Ww	ww
w	Ww	ww

50 % long whiskers

50 % short whiskers

2. In purple people eaters, one horn (H) is dominant and no horns (h) is recessive. Complete the punnett square to show the cross of two hybrid purple people eaters. Summarize the genotypes and phenotypes of the possible offspring.

	H	h
H	HH	Hh
h	Hh	hh

Possible genotypes of offspring:  
HH, Hh, hh

Possible phenotypes of offspring:

75% one horn

25% no horn

3. In cats, long hair (L) is dominant over short hair (l). Complete the punnett square to show a cross between two short-haired cats.

	l	l
l	ll	ll
l	ll	ll

What is the probability that the parents will produce a short-haired kitten?

100 %

4. In Noombats, yellow bellies (Y) are dominant over green bellies (y).

- a. Complete the punnett square to show a cross between a purebred yellow bellied noombat and a noombat that is a hybrid for belly color. What is the probability that the parents will have yellow bellied offspring?

	Y	Y
Y	YY	YY
y	Yy	Yy

100 % yellow bellied

0 % green bellied

- b. Is it possible for two yellow bellied noombats to have a green bellied child? Yes!  
Identify the genotypes of the parents and complete the cross on the punnett square.

	Y	y
Y	YY	Yy
y	Yy	yy *

- a. Genotypes of the parents:

Yy and Yy

- b. Can the yellow bellied parents produce a green bellied child?

yes!

- c. If yes, explain how and identify what the probability would be.

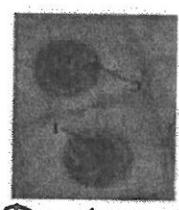
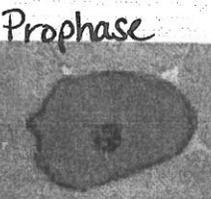
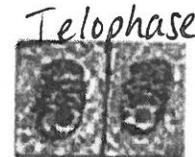
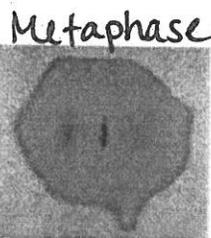
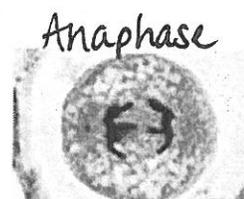
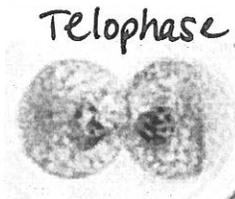
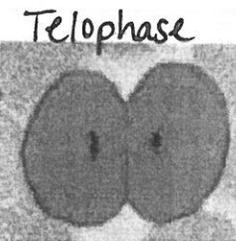
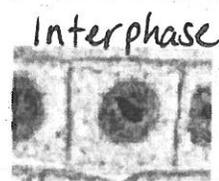
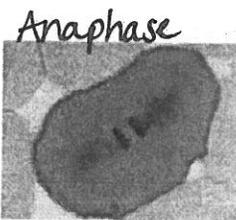
25% chance for yy =

green bellies

Name KEY

Date \_\_\_\_\_

Use your textbook to help you identify the stages.  
Label each cell with the stage of cell division or mitosis shown.



Metaphase

Prophase

Anaphase



Interphase

Anaphase

Name KEY Date \_\_\_\_\_

## Heredity & Genetics Scavenger Hunt Worksheet

Use your science textbook and other resources around the room to help you complete the following. After each answer, indicate where you found the answer (e.g. textbook page C43, Genomics poster, etc).

- 20) What is the purpose of a Punnett square?  
**predict offspring traits**
- 21) If a tall plant (TT genotype) is crossed with a dwarf plant (tt genotype), what is the probability that the offspring plants would be tall? **100%**
- 22) What type of plants would you have to cross to get a dwarf plant?  
**hybrid or other dwarf**
- 23) From the "Genomics" poster, what is genomics?  
**study of genes**
- 24) On the "Genomics" poster, how many chromosomes and genes does a human have? **46 chromosomes**
- 25) On the "Cracking the Code of Life" poster, what did Watson and Crick discover in 1953? **structure of DNA**
- 26) On the "Cracking the Code of Life" poster, when was the human genome sequence published? **2003**
- 27) What are some differences between the corn and pea plants?  
**shape, height, color, flavor**
- 28) What causes these differences between corn and pea plants?  
**genes**
- 29) What are the large structures shown on "The Human Genome" poster?
- 30) From "The Human Genome" poster, what are some genes of interest found on chromosome 5? **Cri du chat disorder, cell division**
- 31) The diameter of the nucleus of a cell is approximately 1/100,000 of a meter. The diameter of Earth is 12,756,000 meters. Write each of these in scientific notation.  
 **$1.2756 \times 10^7$        $1.0 \times 10^{-5}$**
- 32) How many times bigger is Earth than a nucleus.  
 **$10^{12}$**
- 33) Give an example of a genetic disease.  
**cystic fibrosis**
- 34) How do people get this genetic disease?  
**recessive alleles**
- 35) What is an example of a genetic disease that can be influenced by human behavior and the environment?  
**Cancers**

Name

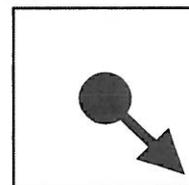
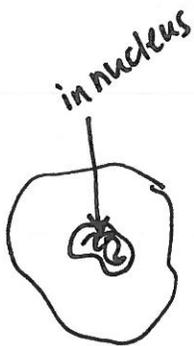
KEY

Date

## Heredity & Genetics Scavenger Hunt Worksheet

Use your science textbook and other resources around the room to help you complete the following. After each answer, indicate where you found the answer (e.g. textbook page C43, Genomics poster, etc).

- 1) What is DNA? *genetic information*
- 2) What are genes? *Sections of DNA coding for a trait*
- 3) What are chromosomes? *tightly coiled sections of DNA*
- 4) Write a sentence explaining the relationship between the words DNA, genes, and chromosomes. *genes on chromosomes, chromosomes made of DNA*
- 5) On the back, draw a sketch showing where DNA is located in a cell.
- 6) Name three examples of genetic traits that you inherited from your parents. *eye color, eye shape, nose shape*
- 7) Name two traits that you acquire during your life. *how to swim, how to read*
- 8) How are traits passed from parent to their offspring? *half parent's DNA in sex cells fuse to get offspring*
- 9) How many chromosomes do humans have? *46 (23 pairs)*
- 10) Why is Gregor Mendel considered to be the "Father of Genetics"? *recognized patterns of inheritance in pea plants*
- 11) What is the difference between a dominant trait and a recessive trait? *only one dominant allele needed to express trait*
- 12) What is an example of a dominant human trait? *brown eyes*
- 13) What is an example of a recessive human trait? *blue eyes*
- 14) What is the ratio of people in the room who are female? *1:1*
- 15) Rewrite 1:4 as a percent. *25%*
- 16) What percent of the room is male? *~50%*
- 17) Is gender an inherited or acquired trait?
- 18) Using the Student Science Dictionary, what does DNA and RNA stand for? *deoxyribonucleic acid; ribonucleic acid*
- 19) What is the probability/likelihood of the spinner landing on a shaded region? Represent this mathematically in 3 ways.



Use the computers available to complete the following table on Genetic Conditions:

KEY

<http://kidshealth.org>

Genetic Condition	Cause	Characteristics	Difficulties	Cure	Treatment
Cystic Fibrosis	recessive gene	thick/sticky mucous	bacterial infections in lungs + GI tract	none	physical therapy, antibiotics, healthy diet, other medications
Sickle-cell Disease	recessive gene	moon shaped red blood cell	can't make new blood as quickly can't carry O <sub>2</sub> as well	Sometimes bone marrow transplant	penicillin folic acid blood transfusions
Hemophilia	X-linked gene	blood doesn't clot properly -defective clotting protein	bruises easily excessive bleeding joint swelling	gene therapy	shots of clotting factor
Down's Syndrome	extra chromosome (trisomy)	extra DNA causes problems with body development	Slower development prone to infection heart defects	none	medicines surgeries