

Whose Poop?

Teacher's Guide

Before Class Begins

1. Print the images on the following pages.
 - Depending on groupings and class size, you may have to print multiple copies of pages 6-10.
2. Cut out each box
 - Do not separate the genetic information from the image for the samples on pages 2-8.
3. Tape the species cards around the room; they can be on desks or walls.
 - **Carefully fold the card in half so that the genetic information behind the photo is not easily seen.**
4. Place them so students can easily move around the room to observe the species and determine the source of the fecal sample.

Instructional Guide

Part 1: Without genetic information

1. Organize students into pairs (one group may have 3)
2. Distribute the student handouts
3. Distribute one fecal sample **without genetic information** to each student pair (pages 9-10).
 - It will be necessary to distribute duplicate samples. Depending on class size, two or more groups may receive the same fecal sample - this duplication contributes to class discussion.
4. Allow students to move around the room to "observe" the animals in the area (approximately 5 minutes).
 - After five minutes, instruct each pair to stand beside the animal they believe deposited the fecal sample.
5. Ask students to raise their hands if they are certain their sample belongs to the animal they selected.
6. Ask for volunteers (starting with those who raised their hands) to explain their decisions and facilitate discussions between student groups.
7. Give students 5-10 minutes to complete page 1 of their student handout.
8. Ask students what information could make the identification easier.
9. When students suggest genetic information (may require prompting), ask them to return to their seats, where they can exchange their fecal samples for the **same fecal sample** but with the genetic information included.

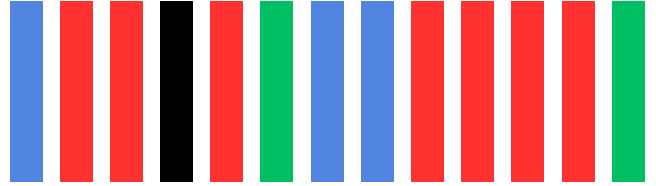
Part 2: With genetic information

1. Inform students that the DNA from the fecal sample was collected and amplified, generating a bar code found on their new fecal sample.
2. Inform students that the genomes of organisms known to be in the area have been collected and barcoded. The section of DNA and a barcode can be found on the back of animal cards.
3. Allow students to move around the room to compare the DNA collected from the fecal sample to the known bar codes of the animals in the area (approximately 5 minutes).
 - After five minutes, instruct each student group to stand beside the animal they believe deposited the fecal sample.
4. Ask students to raise their hands if they are certain their fecal sample belongs to the animal they selected.
5. Ask for volunteers (starting with those who raised their hands) to explain their decisions and facilitate discussions between student groups.
6. As groups share their results, students may fill in the photographs on their handouts to identify the sources of all nine samples.
7. Give students 5-10 minutes to complete page 2 of their student handout.



Lontra canadensis

CTTGTACCTTTTATTTCGGTGCG
 TGAGCTGGAATGGTAGGAACT
 GCTCTTAGCCTACTAATCCGAG
 CCGAATTAGG

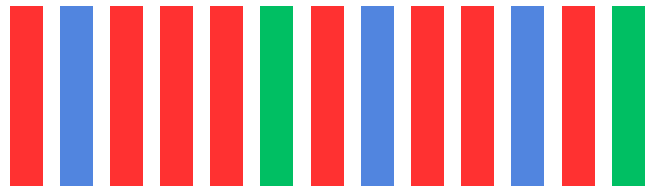


Lontra canadensis (American river otter)



Lynx rufus

TCTTTATCTTCTATTTCGGTGCC
 TGGGCCCGGTATGGTGGGGACT
 GCCCTCAGTCTCCTAATCCGA
 GCCGA ACTGGG



Lynx rufus (bobcat)



Castor canadensis

ACGCTGTA CTTGATGTTCCGGTG
 CTTGAGCAGGGATAGTGGGAA
 CCGCCCTAAGCCTACTAATTTCG
 AGCAGAGCTA



Castor canadensis (American beaver)



Ursus americanus (American black bear)

Ursus americanus

TCTCTACCTTCTGTTCCGGTGCAT
GAGCCGGAATAGTAGGTACTGC
TCTCAGCCTTTTAATCCGTGCC
GAGCTAGG



Mephitis mephitis (striped skunk)

Mephitis mephitis

ACTCTTTATCTTTTATTCCGGAGC
ATGGGCTGGAATAGCAGGAACT
GCCCTTAGCTTATTAATTCGGG
CTGAGCTG



Vulpes vulpes (red fox)

Vulpes vulpes

TTTATATTTGCTATTCGGGGCA
TGAGCCGGTATAGTAGGCACT
GCCCTAAGCCTCCTAATTCGA
GCCGAATTGGG

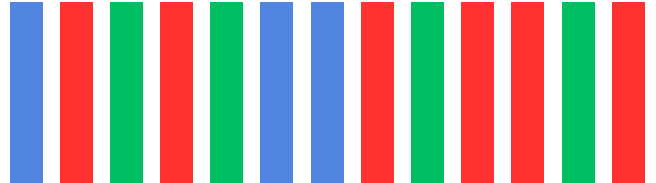




Homo sapiens (human)

Homo sapiens

CTATACCTATTATTTCGGCGCAT
GAGCTGGAGTCCTAGGCACAG
CTCTAAGCCTCCTTATTTCGAGC
CGAGCTGGGC



Canis lupus familiaris (dog)

Canis lupus familiaris

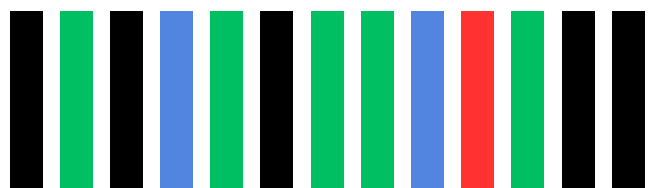
AACCGATGATTGTTCTCCACTA
ATCACAAGGATATTGGTACTTT
ATACTTACTATTTGGAGCATGA
GCCGGTATA



Sylvilagus floridanus
(eastern cottontail)

Sylvilagus floridanus

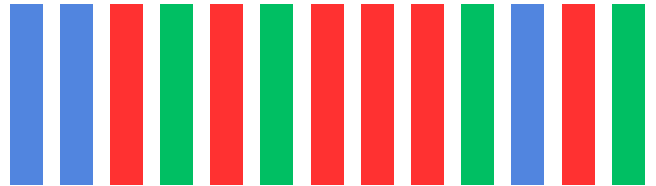
GAGCAGAACTAGGTCAACCAG
GGACCCTACTCGGAGACGATC
AGATCTATAATGTAATCGTTAC
AGCACATGCCT





Odocoileus virginianus

CCTATATTTACTATTTGGTGCT
TGAGCAGGTATAGTAGGAACT
GCCTTAAGCCTACTAATCCGTG
CTGAACTGGG



Odocoileus virginianus (white-tailed deer)



Canis latrans

CCCGGTACTTTACTAGGCGAC
GACCAAATTTATAATGTCGTCG
TAACCGCCCATGCTTTCGTAAT
AATCTTCTTC



Canis latrans (coyote)



Procyon lotor

TCTCAGCCTACTAATTCGTGCT
GAGTTAGGTCAACCGGGTACTT
TATTAGGAGATGATCAGATTTA
CAATGTAAT



Procyon lotor (raccoon)



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Amplified DNA Fragment

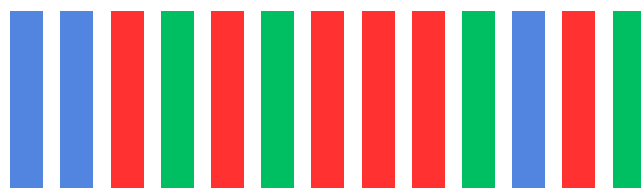
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CCCGGTACTTTACTAGGCGAC
GACCAAATTTATAATGTCGTCG
TAACCGCCCATGCTTTCGTAAT
AATCTTCTTC

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Amplified DNA Fragment

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CCTATATTTACTATTTGGTGCTT
GAGCAGGTATAGTAGGAACTGC
CTTAAGCCTACTAATCCGTGCTG
AACTGGG

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Amplified DNA Fragment

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TCTCAGCCTACTAATTCGTGC
TGAGTTAGGTCAACCGGGTAC
TTTATTAGGAGATGATCAGATT
TACAATGTAAT

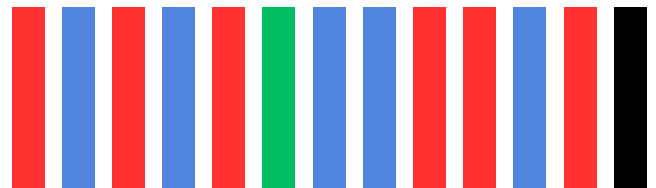
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Amplified DNA Fragment

```
TTTATATTTGCTATTCGGGGC
ATGAGCCGGTATAGTAGGCA
CTGCCCTAAGCCTCCTAATTC
GAGCCGAATTGGG
```

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Amplified DNA Fragment

```
TCTCTACCTTCTGTTTCGGTGCAT
GAGCCGGAATAGTAGGTACTGC
TCTCAGCCTTTTAATCCGTGCC
GAGCTAGG
```

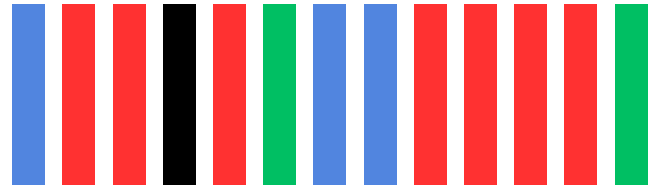
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Amplified DNA Fragment

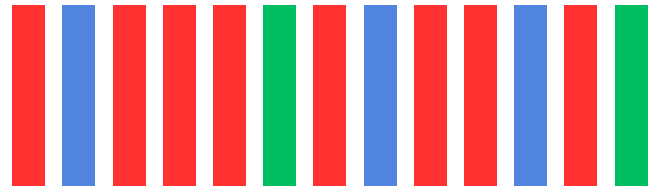
```
ACTCTTTATCTTTTATTCGGAGC
ATGGGCTGGAATAGCAGGAACT
GCCCTTAGCTTATTAATTCGGG
CTGAGCTG
```

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Amplified DNA Fragment

CTTG TACCTTTTATTCGGTGCCT
 GAGCTGGAATGGTAGGAACTGC
 TCTTAGCCTACTAATCCGAGCC
 GAATTAGG



Amplified DNA Fragment

TCTTTATCTTCTATTCGGTGCCT
 GGGCCGGTATGGTGGGGACTG
 CCCTCAGTCTCCTAATCCGAGC
 CGAACTGGG

© Kim A. Cabrera



Amplified DNA Fragment

ACGCTGTACTTGATGTTTCGGTG
 CTTGAGCAGGGATAGTGGGAAC
 CGCCCTAAGCCTACTAATTCTGA
 GCAGAGCTA

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