

Lab Materials

Chapter 1: DNA Modeling and Decoding

Toothpicks, ~25

~40 gumdrops of four different colors each

Chapter 2: Acids, Bases, and Buffers, Oh my!

1 small head of red cabbage

1 gallon distilled water

Large empty water bottle or freezer baggie

Baking soda

Strainer

5-6 clear drinking glasses or cups

White vinegar

Lemon juice

Clear soda (Sprite, 7Up, etc.)

Clear apple juice

Measuring spoons and cups

Chapter 3: ESP: Fruity Enzymes

2-4 Pyrex test tubes that can hold at least 10mL (2tsp) of fluid*

Measuring spoons

Glass measuring cups

Heating source

One cup fresh pineapple

Small bowl with ice

One box of Jello™ gelatin

3 eye droppers or pipettes (optional)

**If you are going to be running experiments at home. You can't beat the safety and durability of Pyrex tubes! They're fairly cheap online and are a good investment for young experimenters!*

Chapter 4: Bobbing for Catalase

Yeast

Measuring spoons and cups

7 clear small/short drinking cups (glass would be best - disposable plastic will work)

One coffee filter

Hole punch or scissors

Hydrogen peroxide (3%)

Distilled water

Tweezers, tongs, etc.

Timer

Chapter 5: ESP: Potato Osmosis

1-2 Large Russet (baking) potatoes

Knife

3 tall drinking glasses

Distilled water

Salt

Measuring spoons

Metric ruler (you will need to measure in millimeters - mm)

Paper/pencil

Chapter 6: Spontaneous Drinking Straws

Tap water

Large mouthed jar or pot

3-4 plastic drinking straws

Scissors

Chapter 7: ESP: Fungal Fermentation

Dried yeast

Sugar

Small plastic syringe without a needle (most pharmacies will have these)

Large bowl or baking dish

Weighted object (e.g. fork, jar, etc.)

Ice

Heating source

Chapter 8: Chlorophyll enhancement

2 cups (~250g) fresh green beans, asparagus, or sugar snap peas

Measuring cups and spoons

Vinegar

Baking soda

1 can of cut green beans

Large bowl of ice water

1-3 small pots or pans

1-3 glass jars, glasses, etc.

White paper towels or plates

Chapter 9: Modeling DNA Replication

1-2 rolls of self-adhering sport bandages in two colors (aka - "sports wrap" or "pre-wrap" - look for the reversible/two-color type to save \$\$\$)

Marker

Tape

Chapter 10: Pipe Cleaner Meiosis

Four pipe cleaners of different colors

Four beads (large enough to hold two pipe cleaners in each hole)

Four paper plates

Tape

Scissors

Chapter 11: Monster Factory 1 of 2

One six-sided die

Chapter 12: Monster Factory 2 of 2

Master Data Sheet from Chapter 11

Codon Wheel from Chapter 12 reading

Chapter 13: Mendel, Inheritance, and Coin-flipping

Two pennies

Two nickels

Attached data sheet

Chapter 14: Non-Mendelian Three-Card-Monte

Four large paper cones - one yellow, one green, and two blue (templates provided)

One small paper cone made from yellow paper

Three small blue and yellow objects that can easily fit into/under the cones (e.g. candy, erasures, paper wads, etc.)

Tape and scissors

Chapter 15: Family trees and Pedigrees

Paper/Pencil

Chapter 16: Point vs Frameshift Mutations

Copies of worksheets

Codon Wheel

Pencil

Chapter 17: ESP: Genotype vs Allele Frequencies

50 red beans

50 white beans

Bag or bowl

Three plates labeled as "GG", "Gg", and "gg"

Chapter 18: ESP: Genetic Drift via the Founder Effect

50 red beans

50 white beans

Large bowl or bag

Chapter 19: ESP: Coevolution in the garden

~0.5 cups (~10g) fresh horseradish root

(Most larger grocery stores will carry horseradish. If this is not available, use broccoli, Brussels sprouts, cabbage, or cauliflower.)

Blender (mortar and pestle would work)

Fine mesh strainer or coffee filter

Clean glass

2-3 paper towels

Scissors

Two quart size sealable baggies

Stapler

Lettuce seeds (one small envelope will work)

Tape

Marker

Chapter 20: Cladograms vs Phylogenetic trees

Worksheets provided

Chapter 21: Scaling down a virus

20m (65ft) yarn or string

Sharp pencil or mechanical pencil

Metric ruler

Paper

Chapter 22: Tasty Ferments

0.75Tbs Kosher salt (use half as much if using fine table salt)

2 cups water

Knife (and an adult)

$\frac{1}{2}$ head of cabbage

1tsp caraway seeds (optional)

Large bowl

pH paper

Wooden spoon

Quart-sized jar w/ lid (Mason jars work great)

Plastic wrap

Chapter 23: ESP: Artificial Algae Blooms

Two empty 1-2L soda/water bottles (or disposable cups)

Scissors

Miracle Gro fertilizer (1/8tsp or 0.7g) - *individual packets can be purchased at hardware stores now!*

Pond or aquarium water which contains algae

Grow light or sunny window ledge

Camera (optional - but helpful)

Chapter 24: ESP: Fungal spore dispersal

Balloons

Funnel

Scissors

Paper

Meterstick or dowel rod

Measuring tape (if not using a meterstick)

Stick pin

Tape

String

Coin (or similar object)

Chapter 25: ESP: Xylem, Phloem, and Celery

One bunch of celery with leaves

Knife

Red food coloring

Clear plastic bag (large)

Tape

Three drinking glasses

Fan

Chapter 26: Fruit dissection 101

1 Roma tomato, hot pepper, and lime*

Knife

Protective gloves

Cutting board

**Add three more tomatoes, one small bunch of cilantro, one more lime (if they are small) and a small onion if you would like to make your own pico de gallo (the recipe is below).*

Chapter 27: ESP: The protective nature of our skin

Four sealable plastic bags

Four fresh bananas

One rotten banana

Toothpick

Cotton swab

Chapter 28: Digestive enzymes at work

1-2 Soda crackers (salt free)

Small potato

Beef liver

Hydrogen peroxide

Knife

Three clear disposable cups

Metal spoon

Chapter 29: Population dynamics and white-tailed deer

Food source and habitat destruction cards (cut out individually)

Small box or bowl

Score chart

Chapter 30: Wandering through the Nitrogen Cycle

One six-sided die

Student Worksheet and Stations for the Nitrogen Cycle (provided)

Chapter 31: ESP: Ocean Acidification

Red cabbage juice indicator (from Chapter 2)

Distilled water

Clear plastic cups or drinking glasses

Small cup (e.g. Keurig cups, pill bottles, etc.)

Tape

Plastic wrap

Baking soda

Measuring spoons

Several sheets of white paper

White vinegar

Timer

Chapter 32: ESP: Soil Erosion 101

Two empty plastic 2L bottles

One small water bottle or watering can with a shower head

Heavy scissors/shears

Garden soil (enough to fill each bottle by ~half)

Small rocks, gravel, or leaf litter (one-half bottle-full)

Chive seeds

3 bricks, small blocks of wood, etc.

Measuring cup (at least 2 cups in volume)

Timer