

Buoyancy

Lesson Title: Buoyancy Grade Level: 2-5

Purpose: Teach age appropriate skills for fire and life safety while teaching to statewide learning standards.

Materials Needed (Optional):

For Demonstration:

☐ Pictures of Different Bodies of Water

Standards:

Next Generation Science Standards:

Science:

[PS1.A: Structure and Properties of Matter](#)

Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1)

Different properties are suited to different purposes. (2-PS1-2),(2-PS1-3)

A great variety of objects can be built up from a small set of pieces. (2-PS1-3)

[PS1.A: Structure and Properties of Matter](#)

Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see & are moving freely around in space can explain many observations, including the inflation & shape of a balloon and the effects of air on larger particles or objects. (5-PS1-1)

The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. (5-PS1-2)

Washington State Health and PE Standards

Health

[H1.Sa1.1c](#) Understand fire, water, and sun safety rules.

Safety: _____

☐ Water Safety

☐ Life Jackets

Objectives: The students will demonstrate understanding of:

☐ Water Hazards

☐ Reaching and Throw

☐ Rowing

☐ Protection and Prevention

Vocabulary:

Buoyancy- the ability of an object to float or sink.

~~Density~~- how close particles are in a material.

☐ Displacement-something that happens when an object is submerged in a fluid and the fluid is pushed out of the way (or displaced) to make room for the object

☐ PFD- personal floatation device, or life jacket.

☐

☐



Time: 45-60 minutes for presentation and demonstration.

Instructional Content:

Use this bulleted list to guide you and keep you on track and meeting all objectives for lesson. Everyone has their own style for teaching, the most important thing is to make it fun and engaging for the kids.

☐ Warm up Activities: (5-7 Minutes)

☐ Mini KWL:

☐ Ask students to individually make a mini KWL chart about buoyancy.

☐ K-What do you already know about Buoyancy?

☐ W-What do I want to know about Buoyancy and Density?

☐ Bell Ringer:

☐ Buoyancy Bell Ringer

☐ Have students complete the top portion of the Buoyancy Bell Ringer.

☐ Entrance Ticket:

☐ Ask students to try to define: Buoyancy, Density, Displacement, PFD

☐ Video:

☐ Follow the link:

☐ http://www.snofire7.org/preparedness_education/home_education_lessons/index.cfm?video_id=20&omo=1_1

☐ Watch Video:

☐ Run time: 45:41

☐ Have students fill out the worksheet as they watch.

☐ Closure Activities: (5-7 Minutes)

☐ Buoyancy Bell Ringer:

☐ Have students complete the exit ticket activity on the Buoyancy Bell Ringer Worksheet.

☐ Exit Ticket: On the bell ringer, at the top of the first page, see if you wrote the correct hazards that can be present near each body of water. If not, add to or correct your answers. Did you circle the correct items that will float and sink? If not, correct your answers with a different color!

☐ Exit Ticket:

☐ Ask students to use what they learned to add more detail to the definitions they wrote at the beginning of class for the following words:

☐ Buoyancy, Density, Displacement, PFD

☐ Mini KWL:

☐ Ask students to finish the last column for the KWL chart about buoyancy.

☐ L-What did you learn?

Homework and Enrichment Activities:

☐ Density Experiment

☐ Life Jacket Fitting Challenge

☐ Water Safety Connect the Dots

☐ Wear a Life Jacket Maze

Handouts:



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☐ Buoyancy Bell Ringer ☐ KWL Chart

NAME: _____

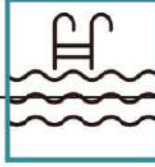


BUOYANCY

BELL RINGER

Directions: Answer the following questions before watching the video. If you don't know the answer, use your best guess:

- 1) List at least two hazards that can occur around each different body of water

			
Ocean	Lake	Pool	River

- 2) Circle the things that float.



- 3) What does it mean to float? What makes something float? _____
- _____

Directions: While watching the video, fill in the blanks, and answer the questions:

- 4) Hypothesis: Write in blue. Will the object float or sink? Write the results with a different color.

OBJECT	FLOAT?	SINK?
Apple		
Orange		
Spoon		

OBJECT	FLOAT?	SINK?
Cork		
Penny		
Bottle		



Name _____

5) **Vocabulary:** Fill in the blanks:

_____ is the ability of an object to float. It has to do with two ideas, displacement and _____, which refers to how close particles are in a material. _____ is the amount of water that is moved aside so that an object can take up that space.

6) List 2 ways the water rescue team can help a person that is in trouble:

1. _____ 2. _____

7) Hypothesis for the Boat Experiment: What do you think is going to happen?

8) What can you do to prevent emergencies in and around the water?

Life Jackets:

9) Where-do we wear them? Circle where we should wear them.

Boats Rivers Lakes Pools Bath Tubs Oceans

Why-do we wear life jackets?

Exit Ticket: On the bell ringer activity at the top of the first page, see if you wrote the correct hazards that can be present near each body of water. If not, add to or correct your answers. Did you circle the correct items that will float and sink? If not, correct your answers with a different color!



MINI KWL CHART



NAME OF STUDENT:

SUBJECT:

LESSON:

**WHAT I
KNOW:**

**WHAT I
WANT TO
KNOW:**

**WHAT I
LEARNED:**



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Begin at START and find your way through the duck pond to the finish line.

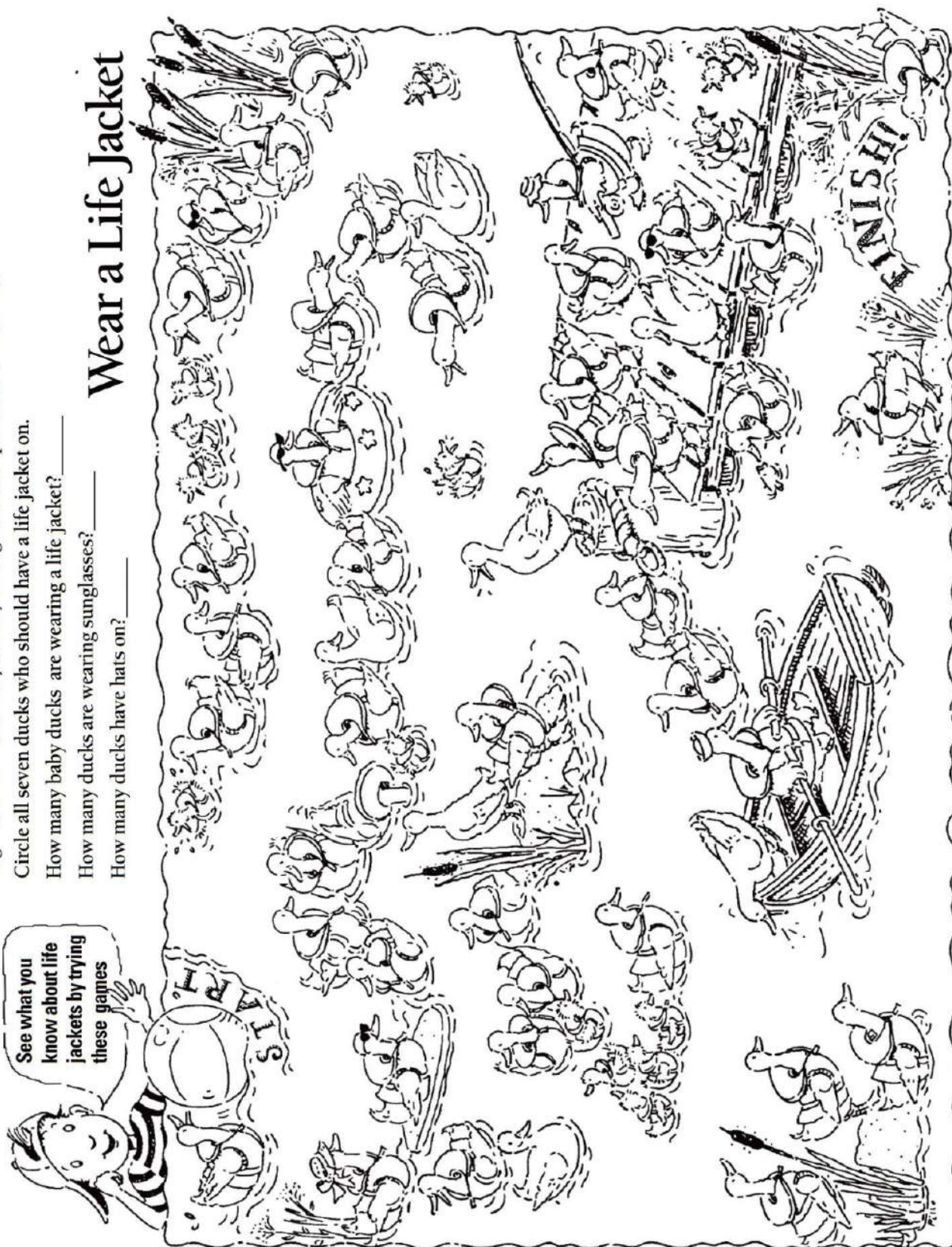
Circle all seven ducks who should have a life jacket on.

How many baby ducks are wearing a life jacket? _____

How many ducks are wearing sunglasses? _____

How many ducks have hats on? _____

Wear a Life Jacket



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Find this worksheet and others at: https://www.seattlechildrens.org/pdf/kids_water_safety_activity_booklet.pdf



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The hunt begins!
Find one water safety
rule in each game.

Connect the dots.



RULE #1 is (Circle the right one.)

- A. Always wear sunglasses.
- B. Always wear a life jacket in a boat or raft, or on an inner tube or dock.
- C. Always wear flippers near the water.

Rule #1: a. Always wear a life jacket in a boat or raft, or on an inner tube or dock.

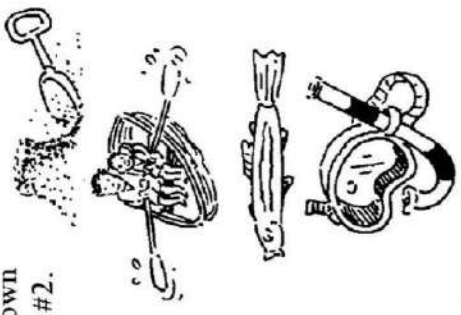
Unscramble the words. Then write down
the circled letters to complete Rule #2.

DANS

OWR

HISF

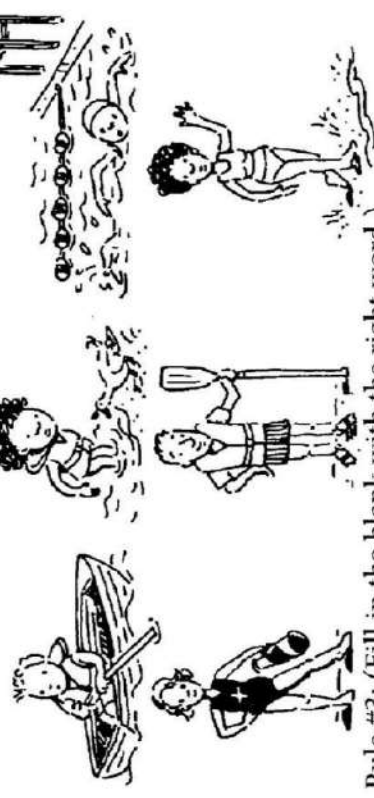
KASM



RULE #2: Learn to _____!
(And keep practicing your strokes!)

Scrambled words: sand, row, fish, mask, Rule #2: Learn to swim!

Every child here needs a partner. Match them up by
drawing a line and guess Rule #3!



Rule #3: (Fill in the blank with the right word.)
Always have an _____ with you when you are in or near the water!

A. Car B. Orange Bird C. Adult

Hold this page up to a mirror to read the secret message!



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Life Jacket Fitting Challenge

1. Find a scale and weigh yourself.
How much do you weigh? _____

2. Based on your weight and the following size guide, circle the size you need.

□ Infant PFDs: 8–30 pounds □ Youth PFDs: 50–90 pounds

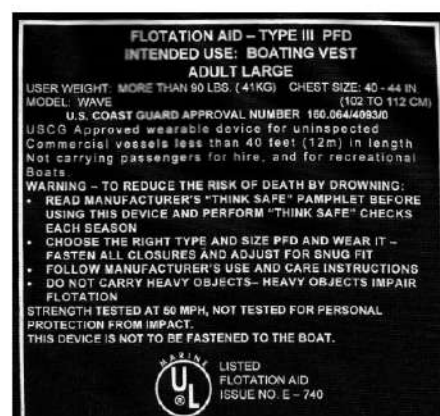
□ Child PFDs: 30–50 pounds □ Adult PFDs: 90+ pounds

Use the black tag to answer the next two questions:

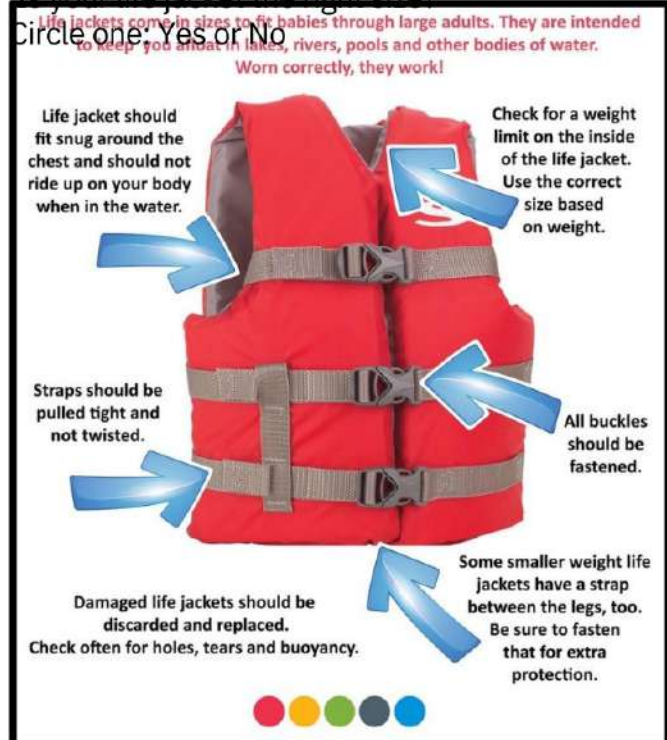
3. How much should a person weigh for this life jacket to fit? _____

4. What is the size of this life jacket? _____

5. Find the tag on the inside of YOUR life jacket. What is the weight requirement on the tag? _____



6. Is your life jacket the right size?
Circle one: Yes or No



7. What are two other areas to check to be sure your life jacket is properly fitted?

1. _____

2. _____



Density Experiment Challenge:

What You Need:

- ☐ 3 150 ml beakers (or use glass jars or clear plastic cups)
- ☐ 600 ml beaker (or use a large jar)
- ☐ water
- ☐ corn syrup
- ☐ vegetable oil
- ☐ food coloring
- ☐ several small objects - raisins, paperclips, pennies, small corks, etc.



Experiment 1: Sink or Swim

Question & hypothesis:

Will a raisin, paperclip, penny, small cork, ball of paper, and other small objects sink or float if they are placed in water, corn syrup and vegetable oil?

Write down what you think will happen when you place each object into the three different liquids.

What You Do:

1. Pour 150 ml of water into beaker #1, 150 ml of corn syrup into beaker #2, and 150 ml of vegetable oil into beaker #3. (If you are using glass jars, use 2/3 cup of liquid, which is approximately 150 ml.)
2. Gently set a raisin in each beaker. Does it sink or float? Write down what happens to the raisin in each beaker.
3. Take the raisins out of the beakers and try a different object, such as a paperclip or cork. Record what happens in each beaker.

Conclusions: Were your predictions right? Did the raisins and other objects sink and float ~~when you expected~~ them to? Did they float in one liquid and sink in another? Why do you think they acted the way they did?

The denser a liquid is, the easier it is for an object to float on it. If one of your objects floated in the corn syrup but sank in the water, what does that tell you about the densities of water and corn syrup? Take the experiment a step further to find out more.



Experiment 2: Mix it up

Question & hypothesis: Which is the most dense: water, corn syrup, or vegetable oil? Which is the least dense? Based on your results from experiment #1, predict which liquid you think is the most dense and which you think is the least dense.

What You Do:

1. Place a few drops of food coloring into the beaker of water so you will be able to tell it apart from the other liquids. (This is not necessary if you are using dark corn syrup.)
2. Carefully pour each of the liquids into a 600 ml beaker or a large jar. Let them settle.
3. What happened? Did the three liquids mix together or separate into layers? Which liquid is at the bottom of the jar? Which is at the top?

Conclusions: Was your prediction right? If so, the liquid you thought was densest should be at the bottom of the jar. The next dense will float on top of that, and the least dense will float at the very top.

Now you know how the densities of the three liquids compare to each other. If you want to find out the approximate density of each, you can calculate it using this formula: $\text{Density} = \text{Mass}/\text{Volume}$.

On Earth we measure mass (how much of a substance there is) by calculating weight (how heavy it is). Weigh each liquid in grams (make sure you subtract the weight of the beaker!) and then divide that number by the volume (number of milliliters) of the liquid.

The answer is density in grams per milliliter.

(Your answer will be more exact if you use a graduated cylinder instead of a beaker to measure the volume and weigh the liquid.)

From <https://www.homesciencetools.com/>. For more experiments and activities visit their website.

