Introducing  Density

KEY CONCEPTS/VOCABULARY (What you need to know)

- Some liquids can mix together—they have the same densities
- Some liquids cannot mix together—they have different densities
- The lighter liquid (with lower density) will float on top of the heavier liquid (with higher density)
- density: similar to, but not the same as weight—density is how much matter is packed into something
- matter: what everything in the world is made up of
- diffusion: when a gas or liquid spreads out to fill a space
- observation: something you saw, heard or noticed
- hypothesis: an educated guess as to what will happen in an experiment

QUESTION (What you want to learn and what to ask the children)

These questions should be asked in order so that children learn that a hypothesis is a guess about what will happen in the experiment. This expands their science vocabulary.

- Do you think water and oil have the same density?
- What do you think will happen if we pour oil into the same container with the water? What is your hypothesis or guess?

EXPERIMENT

Materials (What you need)

Tall glass container, water, food coloring, vegetable oil

Teacher Prep (What to do before the children arrive)

- Fill a tall glass container with water

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Procedures (What to do)

- Add a few drops of food coloring to the glass container
- Ask the children to observe the food coloring spread out gradually without stirring (this is diffusion)
- Tell the children that the food coloring and the water have the same density so they can mix
- Ask the Questions and listen to their hypotheses
- Pour a thick layer of vegetable oil on top of the water

CONCLUSION

Results (What happened?)

- The oil and water will appear to mix at first, but soon all the oil will float up and rest on top of the water
- The oil floats because it has a lower density (is lighter) than the water

Color Mixing and Density

(This should be done as a follow up to the "Introducing Density" experiment)

KEY CONCEPTS/VOCABULARY (What you need to know)

- Liquids with different densities won't mix together
- density: similar to, but not the same as weight—density is how much matter is packed into something
- observation: something you saw, heard or noticed
- hypothesis: an educated guess as to what will happen in an experiment

QUESTION (What you want to learn and what to ask the children)

These questions should be asked in order so that children learn that a hypothesis is a guess about what will happen in the experiment, expanding their science vocabulary

- What happened when we put water and oil into the container?
- What do you think will happen if we shake the bottle filled with (insert color) water and (insert color) oil? What is your hypothesis or guess?

EXPERIMENT

Materials (What you need)

Baby soda bottles or small water bottles, water, red, blue and yellow food coloring, vegetable oil, red, blue and yellow powdered tempera

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Teacher Prep (What to do before the children arrive)

- Dye three cups of water with food coloring—one each, red, yellow and blue
- Dye three cups of vegetable oil with powdered tempera—one each, red, yellow and blue

Procedures (What to do)

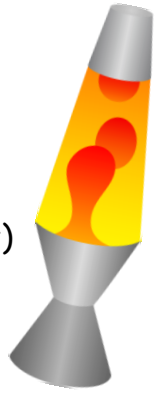
- Ask one child to choose a color of water and a second to choose a contrasting color oil
- Pour equal amounts of each the water and oil into the bottle and seal tightly
- Ask the Questions and listen to their hypotheses
- Shake the bottle
- Point out the new color that is created to the children
- Ask them what they think will happen if we set the bottle aside

CONCLUSION

Results (What happened?)

- The colors mix to form a new color
- The colors separate when the bottle is set aside, however because the water and oil have different densities and can't stay mixed

Gas Powered Lava Lamp



From Steve Spangler Science
(This should be done as a follow up to the "Introducing Density" experiment)

KEY CONCEPTS/VOCABULARY (What you need to know)

- Liquids with different densities won't mix together, but gases can push through the liquid as they try to escape into the air
- matter: what everything in the world is made up of
- diffusion: when a gas or liquid spreads out to fill a space
- density: the measure of how solid something is (how much matter is packed into it)—if you have two objects the same size, the object with a higher density will weigh more
- observation: something you saw, heard or noticed
- hypothesis: an educated guess as to what will happen in an experiment

QUESTION (What you want to learn and what to ask the children)

These questions should be asked in order so that children learn that a hypothesis is a guess about what will happen in the experiment. This expands their science vocabulary.

- What happened when we tried to mix water in oil?
- What happened when we put Alka-Seltzer in water?
- What is your hypothesis or guess?
- What do you think will happen if we drop the Alka-Seltzer into the container with water and oil? What is your hypothesis or guess?

EXPERIMENT

Materials (What you need)

Tall glass or plastic container with lid, water, food coloring, vegetable oil, Alka-Seltzer tablets

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Teacher Prep (What to do before the children arrive)

- Fill a tall container 1/8 full with water (or as many containers as are needed if allowing children to each do their own)

Procedures (What to do)

- Show the children the reaction between Alka-Seltzer and water in a separate container (if you have not already done so in the "Gas Pops the Top" experiment)
- Ask the Questions and listen to their hypotheses
- Demonstrate the experiment first and then repeat with the children
- Add a few drops of food coloring to the container
- Fill the rest of the way with vegetable oil
- Break Alka-Seltzer tablet in 4
- Drop pieces, one at a time, into the container

CONCLUSION

Results (What happened?)

- The oil sits on top of the water because they have different densities
- The oil floats because it has a lower density (is lighter) than the water
- The tablet sinks below the oil to the water and reacts with the water, creating a gas
- The gas tries to escape, floating to the top bringing some of the water with it
- The gas escapes and the water sinks back down
- The movement of the colored water up and down with the gas looks like a lava lamp