



# Moon Phases Simulation

## Topic

Moon phase



Time

1 hour



Safety

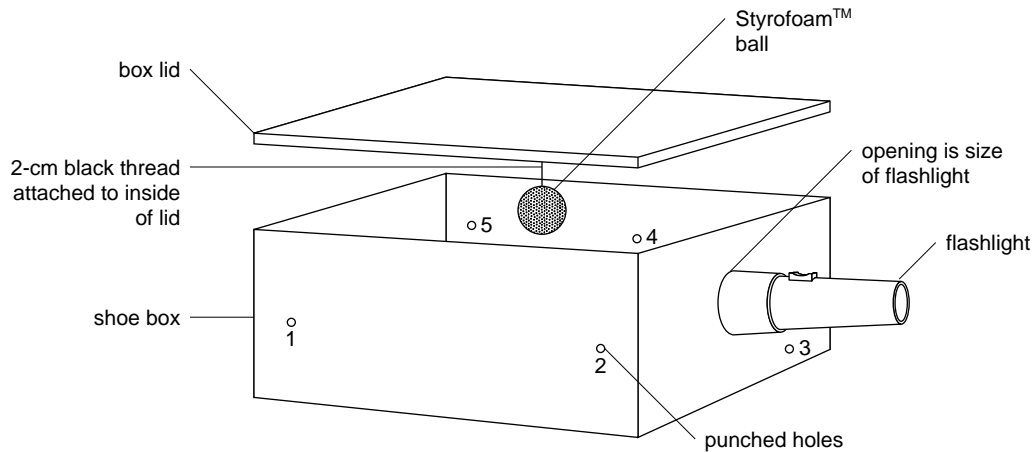
Please click on the safety icon to view safety precautions.

## Materials

shoe box	masking tape
black construction paper	black thread
glue	hole puncher
scissors	pencil
Styrofoam™ ball (5 cm)	modeling clay
flashlight (small, lightweight)	

## Procedure

1. Cut and glue a piece of black construction paper to completely cover the inside cover of the shoebox.
2. Cut a piece of black thread about 2 cm long. Tape or glue the Styrofoam™ ball to one end of the thread. Tape or glue the free end of the thread to the center of the inside box cover.
3. Place the light end of the flashlight against one of the outside short ends of the box. Draw a circle the size of the flashlight on the box. Remove the flashlight and cut out the drawn circle.
4. Punch two small holes into each of the long sides of the box (see figure).
5. Punch one small hole approximately 2 in. and to the right of the flashlight hole (see figure).
6. Number the holes indicated as 1 to 5 on the figure.
7. Secure, with masking tape or modeling clay, the flashlight facing into the box through the larger hole on the short side of the box. Make sure that no light shows through.
8. Turn the flashlight on, look through each small hole, and record your observations. Draw a picture of what you observe.



### What's Going On

In this simulation, the light from the flashlight represents the light from the sun. The Styrofoam™ ball represents the moon. The small holes in the box represent your observation of the moon from different places on earth. A moon phase is just the reflection of the sunlight. The moon is a satellite of the earth; therefore it travels around the earth. Only one side of the moon faces the sun. As the moon travels around the earth different sections of the moon reflect the sunlight. We call these sighted portions moon phases. The moon goes through a number of phases from new moon to full moon to quarter moon every month.

### Connections

From 1969 to 1972, numerous space missions explored the moon. The moon is considered to be geologically dead. It has low surface gravity and is considered to have no water, atmosphere, vegetation, or animal life. The missions determined that the moon has dust everywhere. Lunar rocks are similar to molten rock formed on earth. Lunar rocks contain little iron and no water.

### Additional Activities

Darken a room, and put a lamp in a lighted doorway. Stand in the darkened room. Hold a volleyball or any other large ball over your head in front of you. Turn yourself around and observe the light reflected on the ball.

# Safety Precautions

READ AND COPY BEFORE STARTING ANY EXPERIMENT

Experimental science can be dangerous. Events can happen very quickly while you are performing an experiment. Things can spill, break, even catch fire. Basic safety procedures help prevent serious accidents. Be sure to follow additional safety precautions and adult supervision requirements for each experiment. If you are working in a lab or in the field, do not work alone.

This book assumes that you will read the safety precautions that follow, as well as those at the start of each experiment you perform, and that you will *remember* them. These precautions will not always be repeated in the instructions for the procedures. It is up to you to use good judgment and pay attention when performing potentially dangerous procedures. Just because the book does not always say “be careful with hot liquids” or “don’t cut yourself with the knife” does not mean that you should be careless when simmering water or stripping an electrical wire. It *does* mean that when you see a special note to be careful, it is extremely important that you pay attention to it. If you ever have a question about whether a procedure or material is dangerous, stop to find out for sure that it is safe before continuing the experiment. To avoid accidents, always pay close attention to your work, take your time, and practice the general safety procedures listed below.

## PREPARE

- Clear all surfaces before beginning work.
- Read through the whole experiment before you start.
- Identify hazardous procedures and anticipate dangers.

## PROTECT YOURSELF

- Follow all directions step by step; do only one procedure at a time.
- Locate exits, fire blanket and extinguisher, master gas and electricity shut-offs, eyewash, and first-aid kit.
- Make sure that there is adequate ventilation.
- Do not horseplay.
- Wear an apron and goggles.
- Do not wear contact lenses, open shoes, and loose clothing; do not wear your hair loose.
- Keep floor and work space neat, clean, and dry.
- Clean up spills immediately.
- Never eat, drink, or smoke in the laboratory or near the work space.
- Do not taste any substances tested unless expressly permitted to do so by a science teacher in charge.

## USE EQUIPMENT WITH CARE

- Set up apparatus far from the edge of the desk.
- Use knives and other sharp or pointed instruments with caution; always cut away from yourself and others.
- Pull plugs, not cords, when inserting and removing electrical plugs.
- Don’t use your mouth to pipette; use a suction bulb.
- Clean glassware before and after use.
- Check glassware for scratches, cracks, and sharp edges.
- Clean up broken glassware immediately.

- Do not use reflected sunlight to illuminate your microscope.
- Do not touch metal conductors.
- Use only low-voltage and low-current materials.
- Be careful when using stepstools, chairs, and ladders.

#### USING CHEMICALS

- Never taste or inhale chemicals.
- Label all bottles and apparatus containing chemicals.
- Read all labels carefully.
- Avoid chemical contact with skin and eyes (wear goggles, apron, and gloves).
- Do not touch chemical solutions.
- Wash hands before and after using solutions.
- Wipe up spills thoroughly.

#### HEATING INSTRUCTIONS

- Use goggles, apron, and gloves when boiling liquids.
- Keep your face away from test tubes and beakers.
- Never leave heating apparatus unattended.
- Use safety tongs and heat-resistant mittens.
- Turn off hot plates, bunsen burners, and gas when you are done.
- Keep flammable substances away from heat.
- Have a fire extinguisher on hand.

#### WORKING WITH MICROORGANISMS

- Assume that all microorganisms are infectious; handle them with care.
- Sterilize all equipment being used to handle microorganisms.

#### GOING ON FIELD TRIPS

- Do not go on a field trip by yourself.
- Tell a responsible adult where you are going, and maintain that route.
- Know the area and its potential hazards, such as poisonous plants, deep water, and rapids.
- Dress for terrain and weather conditions (prepare for exposure to sun as well as to cold).
- Bring along a first-aid kit.
- Do not drink water or eat plants found in the wild.
- Use the buddy system; do not experiment outdoors alone.

#### FINISHING UP

- Thoroughly clean your work area and glassware.
- Be careful not to return chemicals or contaminated reagents to the wrong containers.
- Don't dispose of materials in the sink unless instructed to do so.
- Wash your hands thoroughly.
- Clean up all residue, and containerize it for proper disposal.
- Dispose of all chemicals according to local, state, and federal laws.

**BE SAFETY-CONSCIOUS AT ALL TIMES**