Curved Mirrors

Funhouse…

- Have you ever looked into a shiny metal spoon and seen your own reflection?
- When its curvature changes, the reflections seen on each side of a spoon become drastically different.
- When this happens, a spoon appears to transform into a curved mirror.


WHY AM I
UPSIDE-DOWN
WHEN I LOOK IN
A SPOON?
Sci Show

What do you Think...

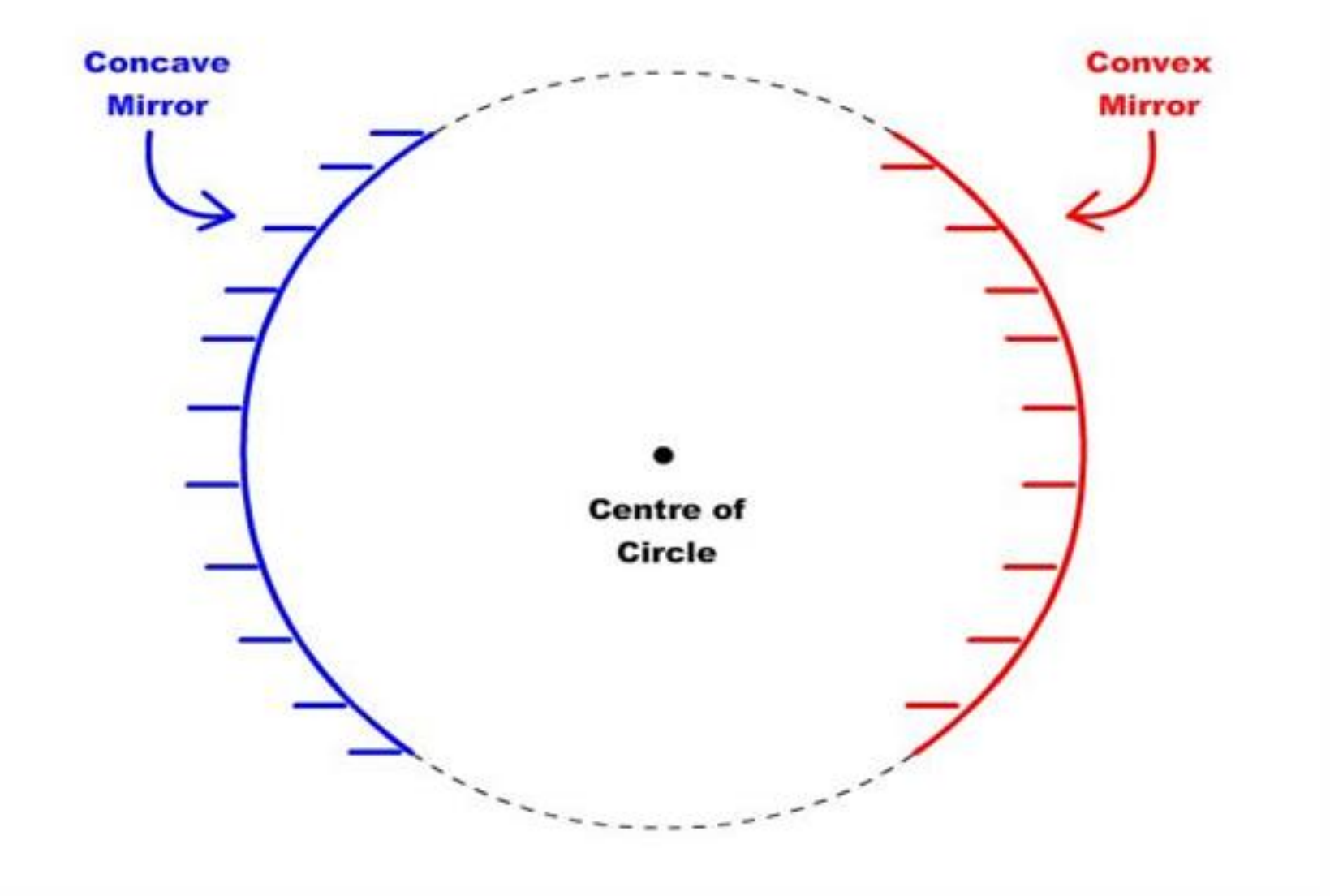
- Find a spoon and check it out for yourself. Which side gives you a clearer image?
- How do you think the size of the spoon might change the way you appear in it? Think about looking into a teaspoon versus looking into a tablespoon versus a serving spoon, and so on.
- Where else have you noticed yourself appearing differently in a reflection? Does your reflection *always* look the same?

- The same science concepts involved in creating your reflection in a spoon are also used to create funhouse mirror images which hilariously distort the way you look. Let's look at how this is done.

Reflections in Curved Mirrors

- Curved mirrors can be used to distort the appearance of an object reflected off them.
- These distortions can change the appearance of an object's shape, size and orientation when they form images.
- Because of this, the image characteristics differ from the characteristics of the object as it would be shown in a plane mirror.
- These characteristics depend on how curved the mirror is and how far away from it an object is positioned.

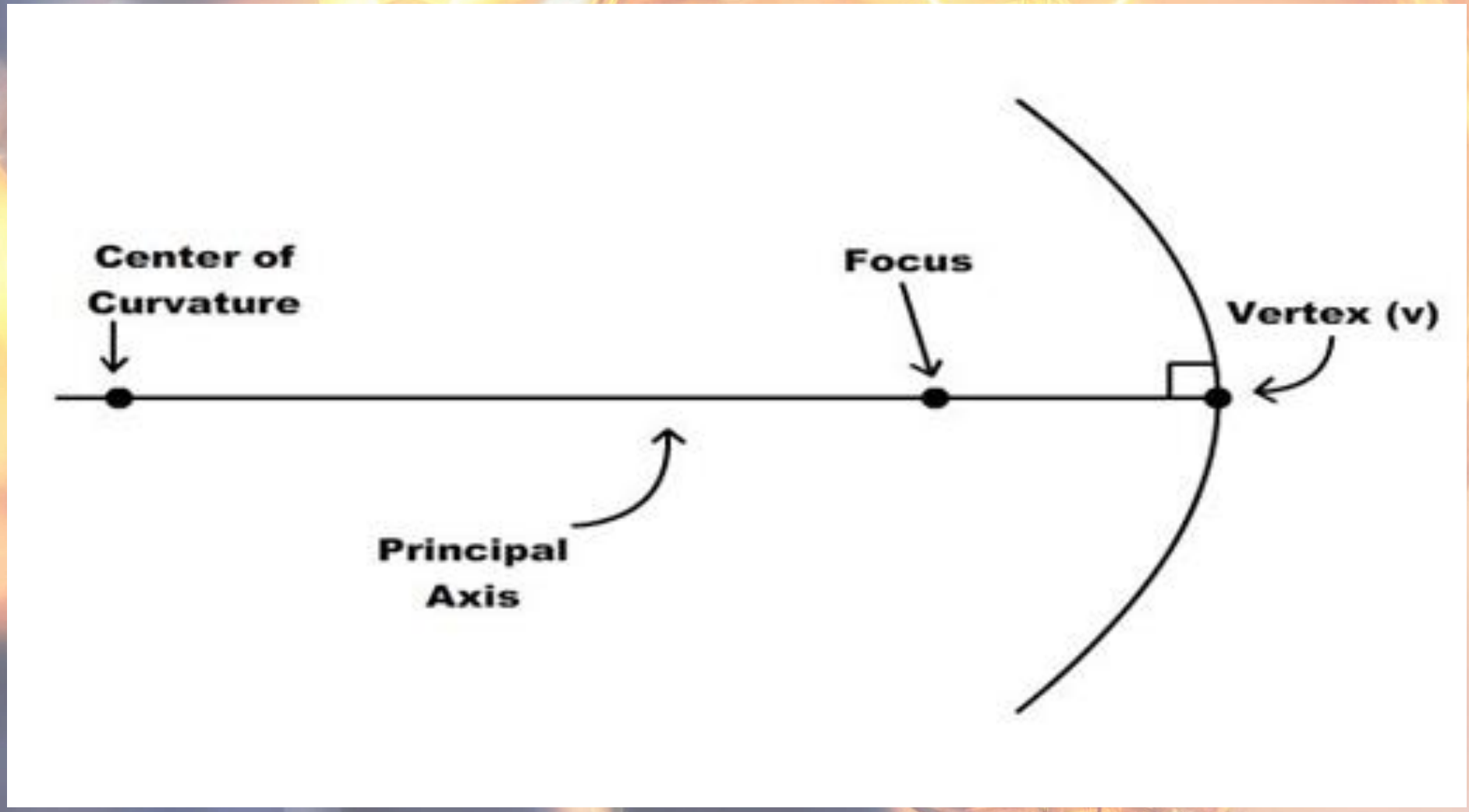
Curved Mirrors



Concave (Converging Mirror)

- Concave or converging mirrors curve away from the object in front of them.
- When an object is viewed close up in a converging mirror, the image in the mirror is always upright and larger than the original object.
- This is useful if you want to magnify an object but keep it looking upright, like when you are applying makeup or the dental hygienist is examining your teeth.
- When objects are farther away from a converging mirror, the image in the mirror appears inverted (upside down) and smaller than the original object.

Terminology

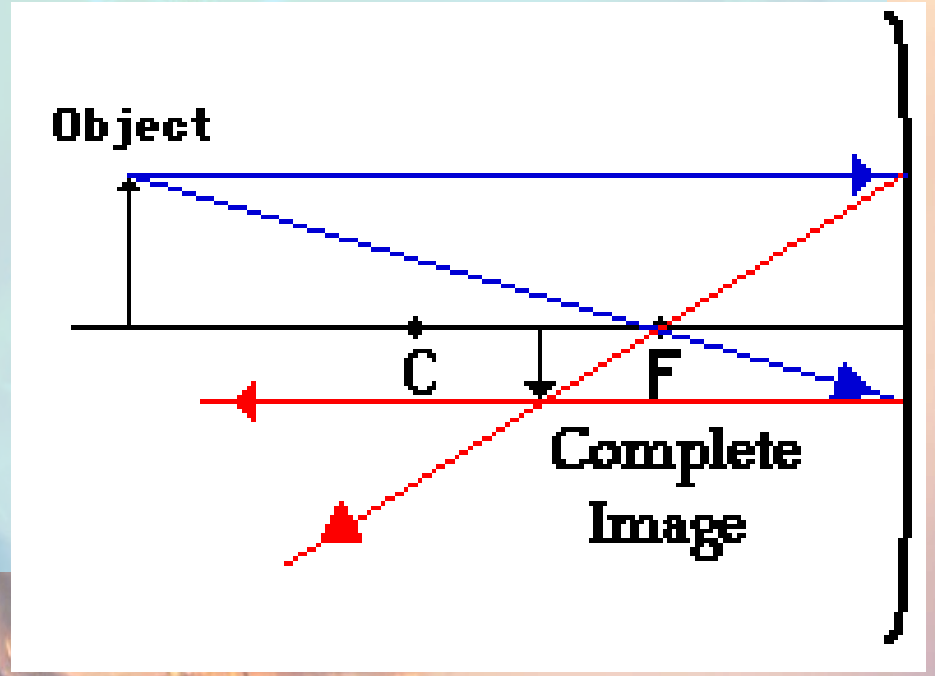


Rules of Reflection for Curved Mirrors

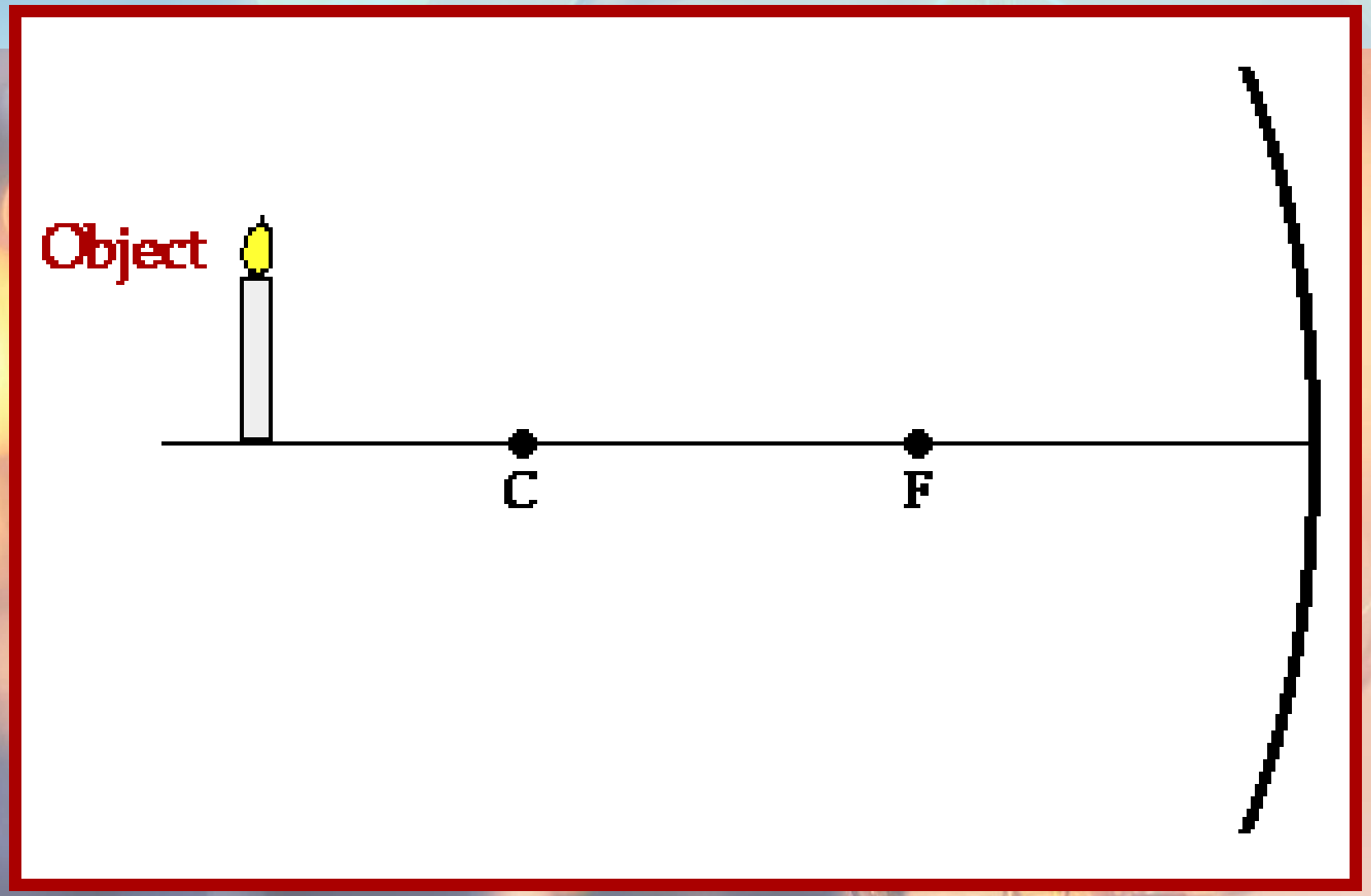
- To draw these diagrams, we will have to recall the two rules of reflection for concave mirrors:
- Any incident ray traveling parallel to the principal axis on the way to the mirror will pass through the focal point upon reflection.
- Any incident ray passing through the focal point on the way to the mirror will travel parallel to the principal axis upon reflection.
- (You need at least two lines to be able to find the reflected image!)

Steps for Drawing

- Draw a ray from the top of the image to the mirror – make it parallel to the principal axis. Reflect that ray through the focal point
- Draw a ray from the top of the image to the mirror through the focal point. Reflect the ray parallel to the principal axis.
- Mark the image and draw!
- What is the SALT?

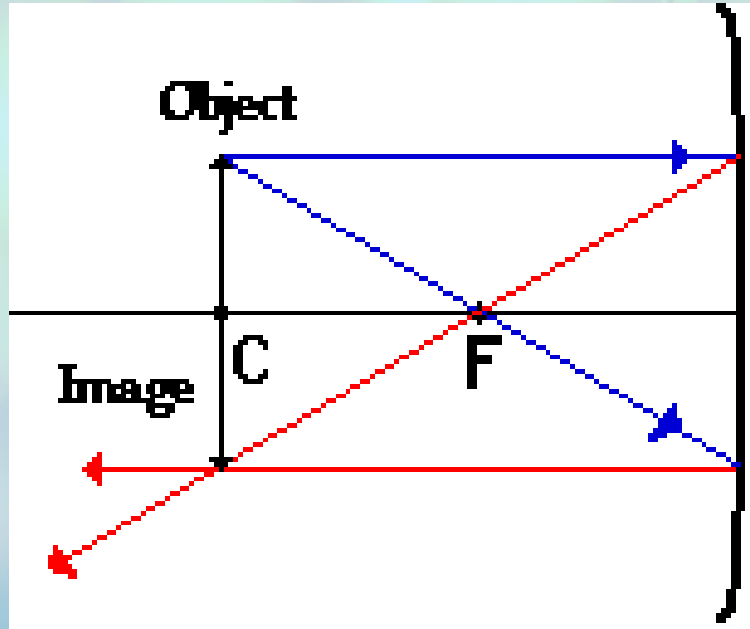


Look-See

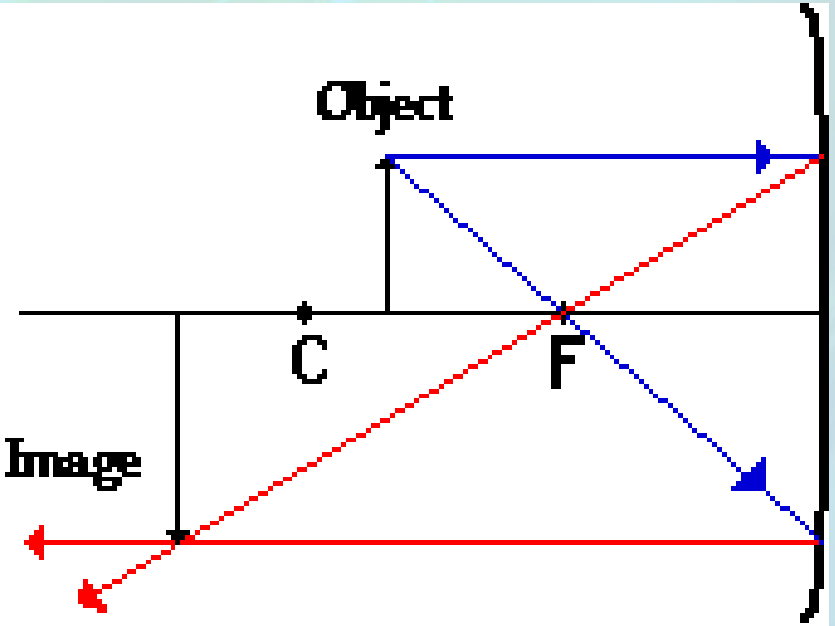


Examples

- What if the object is at C? or between C and F?
- What are the SALT?



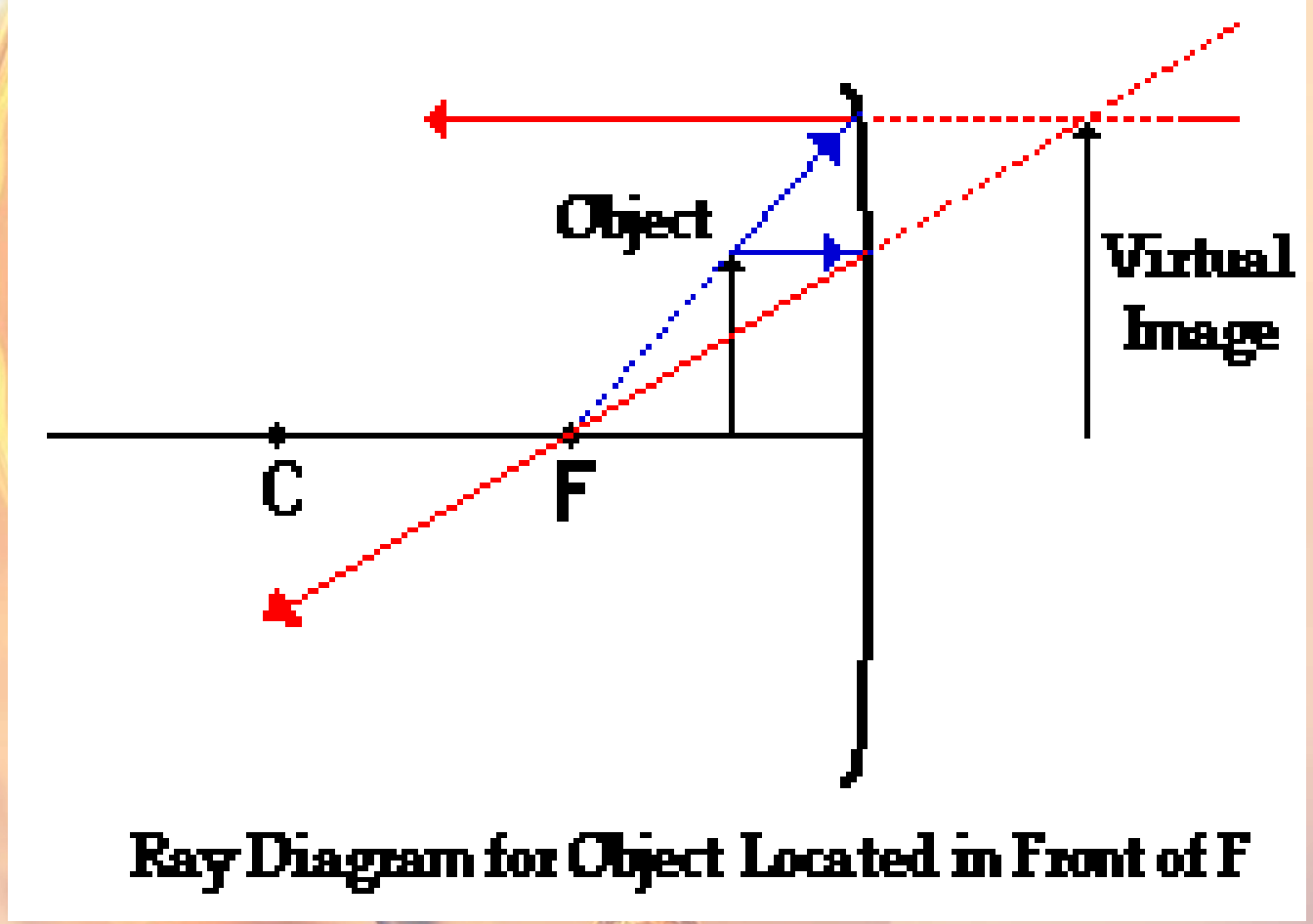
Ray Diagram for Object Located at C



Ray Diagram for Object Located Between C and F

Concave Mirrors and Virtual Images

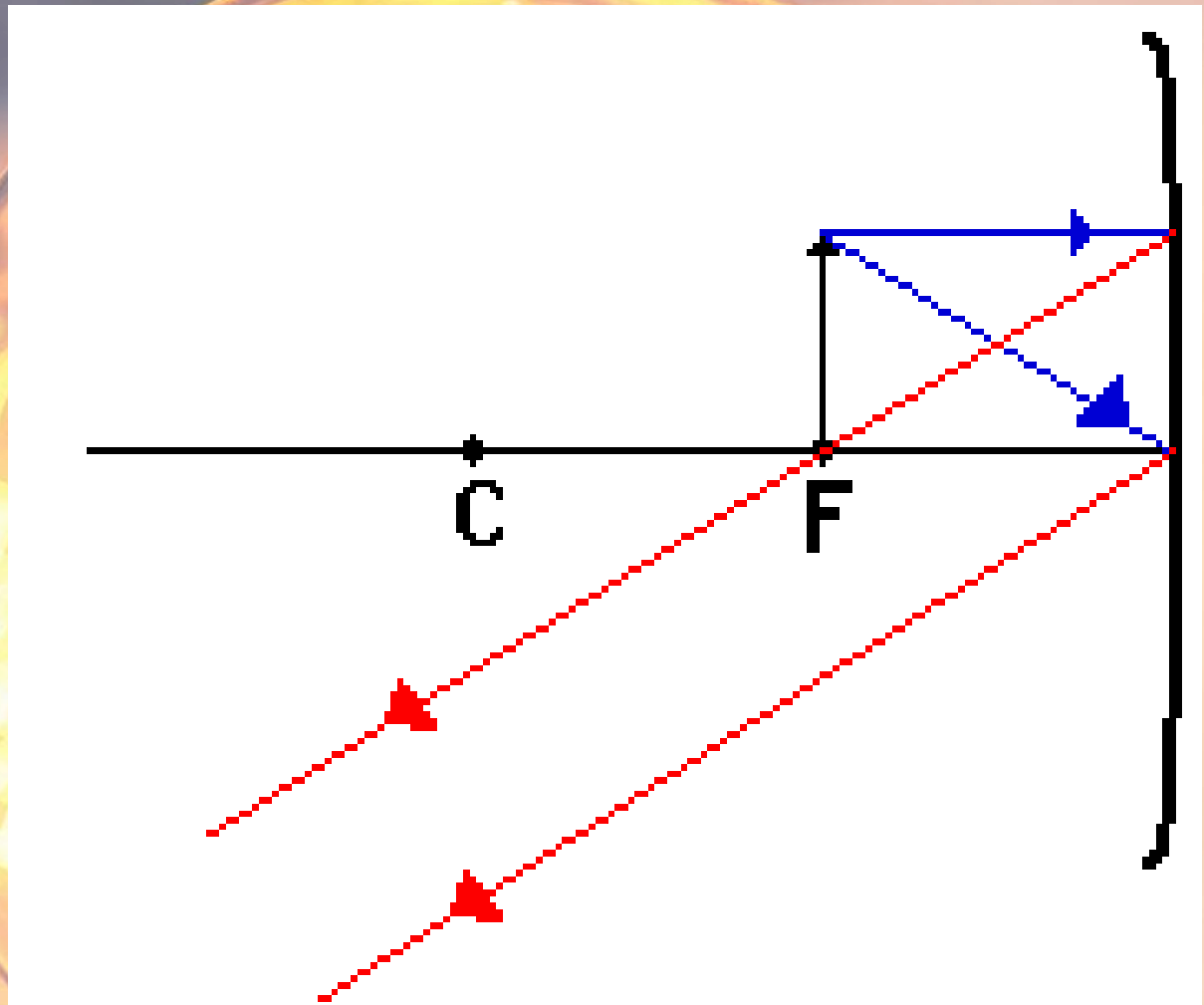
- Image is now between focal point and mirror
- Follow same rules for the ray diagrams



Uses of Concave Mirrors

- Curved mirrors provide many technologies that are useful in our society.
- Astronomers use large parabolic (concave) mirrors in some of their telescopes to concentrate the faint light from distant stars.
- Automobile headlights and flashlights make use of concave mirrors. The light ray is reflected into the curved mirror from the focal point causing the beam to become parallel and easily shown in the forward direction.
- In warmer climates people use solar ovens, which are essentially a curved mirror, to cook their food.
- Heating water, homes, and generating electricity can all be done by using some type of curved mirrors.

Object at Focal Point



Ray Diagram for Object Located at F
(an image is not formed)

Practice

- Please do the Concave practice worksheet…
- There are 11 to try…

- We will do the Convex mirror portion tomorrow!!